Innovation drives growth of hybrid imaging

By Paula Gould

Interest in multimodality imaging shows no sign of abating. New tricks and tools are being up the range of clinical applications, whilst novel technological solutions are paving the way to yet more modality marriages, according to speakers at Sunday’s special focus session on hybrid imaging.

Prof. Liselotte Højgaard, director of clinical physiology, nuclear medicine and PET at Rigshospitalet, University of Copenhagen, described the impact that PET/CT can make on clinical practice.

"Getting a PET/CT system in a nuclear medicine department is a little like getting a tiger instead of a dog," she said.

PET/CT has already proven itself to be particularly valuable in oncology. Imaging with the radiotracer fluorine-18 FDG can identify areas of abnormal metabolic behaviour, and the addition of CT homes in on the site of malignancy. Indications include malignant melanoma and lymphoma, and cancers of the head and neck, oesophagus, breast, lung, and colon.

The development of new tracers may help PET/CT gain a stronger foothold in more clinical areas. For example, imaging with copper-64 ATSM may allow practitioners to identify hypoxic tumours that are more difficult to treat with radiation. This information may be critical to radiotherapy planning. Dementia is another area where PET/CT looks set to play a greater role. The tracers carbon-11 FIB and fluorine-11 FIB look set to make this possible.

Højgaard now wants to see the evidence base catch up with PET/CT practice. Many meta-analyses demonstrating the clinical efficacy of PET/CT have been published, but no such studies have been conducted into the value of PET/CT.

She would also like to see data on the cost-effectiveness of PET/CT. Such analyses should be performed by health economists, who would provide a rigorous and comprehensive assessment, not radiologists, she said.

"We have seen an almost exponential rise in the use of PET/CT," she said. "I think we are now on the change curve of a diagnostic imaging as a whole. In some areas, such as CT, this rise looks likely to continue. But some of the other techniques will demand cost-effectiveness proof of what we are doing. We will have to think cautiously about how to spend our money."

PET/CT could potentially make a significant difference to clinical practice, according to Kuwert. Approximately two million SPECT examinations are performed every year in Europe, making SPECT the ‘imageworkhorse’ of nuclear medicine. Evidence suggests, however, that moving to SPECT/CT could alter diagnoses in 30% of cases. In other words, 700,000 patients in Europe could benefit from the switch.

Kuwert has been using SPECT/CT in Erlangen since 2005. He presented several examples showing the advantages of hybrid imaging over separate scans. For example, in the case of a patient with metastatic thyroid cancer, neither SPECT nor CT alone could pinpoint the site of malignancy. Fusing the two datasets revealed exactly where the surgeon should operate.

SPECT/CT is not just beneficial in oncology, though. It can also be used as a ‘one-stop-shop’ for certain orthopaedic investigations.

"The combination of SPECT and spiral CT has revitalised conventional scintigraphy," Kuwert said.

One concern with hybrid systems is that half of the scanner will always be lying idle. This is not necessarily the most cost-effective use of expensive imaging equipment. Why buy a 64-slice CT scanner if it is going to be welded to a gamma camera and only used for part of each imaging examination? Hospital accountants may query whether this investment is truly worthwhile.

Radiologists must develop strategies for participating in the new age of imaging-based research. They need to join interdisciplinary teams, develop core imaging facilities for host institutions, involve themselves in small animal imaging facilities, enter clinical research programmes, and learn about PET, molecular imaging, which are at the core of pharmaceutical development.

This was the advice of Prof. James H. Thrall, radiologist-in-chief at Massachusetts General Hospital, Boston, in Sunday’s Josef Lissner Honorary Lecture.

He thinks imaging will continue to become more important in basic science and clinical research because of its added value. Also, far more funding will be directed at basic science applications of imaging and imaging biomarkers in clinical trials than on the development of new imaging methods.

On the other hand, Thrall anticipates more turf battles in both basic and clinical research. ‘To ensure radiologists do not lose out, he urges them to continue to develop new methods that others need, but at the same time recognising that they cannot control every aspect of imaging."

Thrall explained how imaging has come of age in biomedical research. “Let’s be honest, in the first 100 years of our discipline, few medical scientists outside of radiology used medical imaging methods in their research,” he said. “Medical imaging was tightly held by radiologists and a few other specialists, such as cardiologists. I regard the 1990s as the watershed era of transformation and expansion of progress.”

Three broad-based advances created this new phase: the development of practical digital methods for acquiring, storing, and analysing images; the invention of new MRI-based functional imaging methods; and the exploitation of new approaches to molecular imaging.

Thrall noted that this progress was illustrated in an editorial last year by Dr. Richard Ehman of the Mayo Clinic in Rochester, Minnesota, US (Blueprint for imaging in biomedical research. Radiology 2007;244:12-27). He drew ECR delegates’ attention to the following sentence from the editorial: Improved spatial and temporal resolution, coupled with new methods including functional and molecular imaging, enable inference at the level of genes, cells, and organs, systems, making imaging methods invaluable as tools in basic biomedical research.

Imaging now occupies an important position in the pantheon of research methods, and scientists from every biomedical discipline use imaging methods as probes of biological systems and structures, he said. More imaging scientists and bio-scientists are working in interdisciplinary teams. Also, imaging methods are transforming entire disciplines, such as the cognitive neurosciences, and are contributing to advances in systems biology and genomics.

This issue should be less of a concern with PET/MRI, according to Dr. Robert Krieg from Siemens Medical Solutions. He outlined details of a prototype PET/MRI system, now installed at the University of Tübingen, Germany, which acquires data for the PET and MRI studies simultaneously.

"Our integrated PET/MRI system is a completely new machine," he said. "You simply cannot do this type of hybrid imaging with an existing PET system."
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- Learning Centres
- Industry Symposia


Pre-registration available at the CIRSE booth in the entrance hall
CT assists in aftermath of terror attacks

By Paula Gould

Radiologists are playing a central role in the aftermath of terror attacks in Israel, delegates heard on Sunday. CT is now regarded as the primary diagnostic tool in incidents involving multiple casualties, Dr. Ahuva Engel told attendees at the ‘ESR meets Israel’ session.

Between 2000 and 2007, Israel was subject to 148 suicide attacks and involved in one war. The number of Israelis wounded in these events topped 8,000.

When a multiple casualty event occurs, more than half of those injured will have reached nearby hospitals within 20 minutes, said Engel, a radiologist at the Rambam Medical Center in Haifa. This influx of casualties can be overwhelming. Good workflow planning is consequently essential.

The aftermath of terrorist attacks can be split into two distinct phases, she said. The initial phase, when most patients are arriving, is typically chaotic. Radiologists’ main objective at this stage is to identify those who are critically injured. The most commonly used imaging strategies are FAST (focused abdominal sonography in trauma) and chest radiography.

Once the casualties have stopped arriving, then radiologists’ priorities will change. Diagnostic work-up will typically involve sequential x-rays and/or CT.

The situation is slightly different in the event of war, she said. There is no “second phase” because the influx of casualties cannot be predicted. All patients must consequently be examined fully when they arrive.

She described the three main types of injuries expected after a terror attack or during war. Air-containing organs, such as the lungs or bowel, may be damaged by the passage of blast waves. Objects propelled outwards by explosions can cause penetrating wounds. Individuals who are thrown into the air or knocked over by the force of a blast may incur closed head wounds, vascular injuries, or orthopaedic injuries. Other possible findings include burns, smoke inhalation after-effects, and crush injuries.

In the case of penetrating wounds, CT can be used to identify the nature and location of any remaining shrapnel or bullets. Nails and screws may also be observed if these were packed inside an explosive device. Delegates were shown images from a suicide bomb victim who had parts of a watch embedded in their neck.

“In recent years, terrorist organisations have been using a variety of different objects in their missiles in order to maximise the damage caused,” Engel said. “Some of the objects seen on CT can be quite bizarre.”

CT is often the second-line imaging tool after FAST in multiple casu- alty events. A whole-body survey is obtained to evaluate the nature and extent of injury, and to plan for a more accurate evaluation of vessels (if required) with CT angiography.

“Sometimes there are numerous fragments of shrapnel. Deciding which piece should be removed is difficult,” Engel said. Axial and 3D reformatted images are used in tandem when making this decision. Debris that is not close to major vessels, and causing no threat to the patient, may be left.

Vascular injuries are extremely common in this patient group, Engel noted. Approximately 25% of patients from a multiple casualty event will undergo CTVA investigation. This can reveal pseudoaneu- rysms, vessel stenosis or dilatation, filling defects, and/or occlusion. She stressed that patients will only be referred for conventional angiography if endovascular treatment is required, or if metal artefacts pre- vent CTA from being diagnostic.

Indian radiologists confront major healthcare challenges

By Philip Ward and H. Andrés Abella

Radiology in India takes centre stage at ECR 2008 on Monday afternoon, when five of the country’s leading researchers will give presentations on imaging of tuberculosis.

You can turn to page 26 of this issue of ECR Today to find out more about the situation in India. Our reporter, Millie-anne Ronges, conducted a wide-ranging interview with Prof. Nadhamuni Kailasakarim, President of the Indian Radiological and Imaging Association. He is a professor of radiology at the Barnard Institute of Radiology and Government General Hospital at Madras Medical College in Chennai.

“The inadequate size of the workforce is a challenge which we have to meet,” he said. “The future will bring functional and molecular imaging and continued expansion of electronic imaging, computer applications and interventional radiology. Coordinating expansion of our curriculum will therefore be essential.”

Additional issues facing India include increasing the research enterprise, managing the information network, and participating in the globalisation of medicine.

Tuberculosis rates in India remain very high, and this helps to explain why doctors there have such extensive knowledge of TB. At Monday’s session, which takes place in Room A from 14:00 to 15:30, ECR delegates will be able to benefit from the speakers’ experiences.

The latest statistics for India are alarming, to put it mildly. The disease continues to kill two people every three minutes, or nearly 1,000 every day, according to Tuberculosis Control India (www.tbcontrol.in.org). The World Health Organization’s 2006 report indicated that India has more new TB cases annually than any other country. Moreover, the Global TB Report 2007 indicated that India is at a substantial risk of developing multidrug-resistant TB on a vast scale.

According to WHO, multidrug-resistant TB accounts for 450,000 new cases worldwide every year, and India is one of six Asian countries that together account for half of new global TB cases. There are concerns among the medical community that TB is getting overlooked in India. This may be due to the overwhelming attention healthcare providers toward some other diseases, such as HIV/AIDS and polio.

Indian radiologists are also rapidly gaining experience in high-end technology. The first PET/CT scanner in India was installed at the Apollo Gleave- gies PET/CT Centre in Hyderabad, Dr. Shaikh Sikandar, radiologist and PET/CT consultant at the hospital, told ECR Today. India has three more scanners in Mumbai, Bangalore, and Delhi. The modality is used for three major applications. Oncology is the most common, accounting for about 80% of examinations. Neurology applications come second with approximately 15%, while cardiology comprises about 5% of the total.

The future development of PET/CT imaging in India looks bright, Sikandar said. With a cyclotron nearby, his facility does not need to obtain radioisotopes anywhere else. And he expects several more scanners to arrive in different areas of India in the near future.

India offers two sharply contrasting realities, with patients from rural areas who cannot afford basic medical care versus people in cities who can afford more, Sikandar said. “The richer people used to go to the US, Europe, or Singapore for a PET/CT scan, he said.

“PET/CT should be in many Indian cities,” he said. “It’s going to change the entire management panorama. For oncologists, it’s very important to know about the staging of cancer, which you can do best with PET/CT. And the diagnosis of cancer is increasing dramatically in India because people are getting better educated about many diseases and the need for accurate diagnosis for proper treatment.”

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In a follow-up refresher course on Sunday afternoon, Krieg and Wong gave more detailed presentations about physics and technology of multimodality imaging systems.

"Over the past few years, major progress has been made in imaging on the CT side," she said. "Now we need to improve our nuclear medi- cine imaging system."
**HIGHLIGHTS**

**European Radiology; congratulations all around!**

Statistics, certificates and wrapped gifts were all on the agenda this morning, at the annual European Radiology Editorial Board meeting, where new editor-in-chief Prof. Adrian Dixon had his first opportunity to publicly offer gratitude to his editorial board and some very valuable contributors.

Beginning with warm personal thanks and a gift for departing editor-in-chief Prof. Albert L. Baert, under whose guidance European Radiology really rose to prominence, Prof. Dixon went on to outline some plans for his own tenure, with

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**Interpretation quiz ends in a draw**

The battle of the sexes took on a new meaning at ECR on Sunday afternoon, when teams of four men and four women took part in the interpretation quiz on the second floor of the Austria Center.

With two perfectly trained teams, a high-spirited moderator, and a selection of the trickiest imaging cases, the traditional event delighted a packed audience. After a ferocious competition, filled with cases such as the broken heart syndrome, and many witty remarks, the final result was a 30–30 draw.

"It was a tight fight, both teams performed excellently and were extremely well prepared," commented Prof. Afshin Gangi, Professor of Diagnostic and Interventional Radiology at the University of Louis Pasteur in Strasbourg, France. "We worked seven hours on the cases yesterday, and I think we did very well, we had real teamwork here."

The women also worked late on the cases, which this year were communicated only one day before the quiz, to add excitement to the event.

"There were some very good questions, with complex cases, many of which were related to interventional radiology," observed Dr. Anne Tardivon, a radiologist at the Department of Radiology of the Institut Curie in Paris. "Both teams were really good. The boys are tough, and the girls were recommended to me as being excellent radiologists," he explained.

"This quiz is a very funny way to actually learn something, and it is both amusing and educational," added Gangi.

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**Awareness and avoidance of MR artefacts raises quality**

Dr. Ute Heilmann from publisher Springer also presenting an update of the journals general progress over the last year.

Matters then moved on to the exciting issue of avoiding artefacts, starting with Prof. Christoph Bremer who was present to receive the award for the most cited paper of the last five years, on behalf of his co-authors Vasili Ntziachristos and Ralph Weissleder.

The battle of the sexes.

Next up was Dr. Annemie Snoeckx, winner of the journal’s Interpretation Corner section, collecting the top accolade for a remarkable second year running, after providing an outstanding 11 out of 12 correct answers.

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Radiographers can enhance the clinical value of their MR examinations by having a greater awareness of artefacts, according to Joseph Castillo of the MRI Unit at Mater Dei Hospital in Malta.

Ugly artefacts can spoil the appearance of an image and frustrate the radiologist, and they need to be avoided. Good artefacts can have a beneficial clinical impact, whilst bad artefacts can mask or even worse mimic pathology, he said.

Chemical shift is an artefact that occurs because fat and water process at different frequencies.

"The range of frequencies along the frequency encoding axis can be compared to the range of notes along a keyboard," he said. "This is essentially how frequency encoding works – the Fourier Transform converts ‘chords’ into the respective ‘notes’.

Magnetic susceptibility artefacts occur because different substances magneto to different degrees, and they have different precessional frequencies; at the interfaces of these structures, dephasing will occur, noted Castillo. To prevent these artefacts, radiographers should ask patients to avoid using thick mascara or makeup with glitter. They should also remove dentures and wear non-metallic clothes. Also, the SW1 (susceptibility-weighted imaging) sequence has been introduced to prevent these artefacts.

To avoid coil-induced artefacts, he has the following tips: choose the coil most appropriate for the corresponding region of interest and field-of-view, select the appropriate elements for coils with multiple configurations, and avoid consulting individual coil manuals.

Compression bands are a possible remedy for artefacts resulting from respiratory motion. They can be effective in pelvic imaging, but not all patients will tolerate compression, and the radiographer may opt to scan the patient in the prone position.

In the same course, Nikolaos Delikanakis, from the department of medical imaging at Korgelezi–Benakiotis Hospital in Athens, outlined why MRI is proving so valuable for the diagnosis of disorders of the central nervous system and the brain. Successful patient care demands appropriate planning, technically correct acquisition, and careful post-processing and analysis of the acquired data, he noted.

The radiographers’ sessions are an ever popular feature of the ECR, and you have still got time to listen to some fascinating lectures before ECR 2008 closes on Tuesday. Monday morning’s refresher course will be dedicated to trauma imaging, and it will comprise talks about introducing digital radiography and the emerging role of the emergency radiographer. It will take place in Room L/M from 08:30 to 10:00. Monday afternoon’s refresher course will concentrate on non-medical applications, and it will include lectures on imaging in archaeology and art. It will take place in Room L/M from 16:00 to 17:30.

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ESR is very proud of the commitment of its 2-Star Supporting Membership Companies. On Saturday, ECR 2008 President Prof. Maximilian Reiser, next year’s Congress President Prof. Rosat Marinic, and ESR Executive Director Peter Bierko took the chance to visit the booths of Az Corp., Shimadzu, and Vital Images. This walk through the technical exhibition provided the opportunity to express ESR’s gratitude to the companies’ representatives for their exceptional support of ESR. In the photo are: Az Corp’s Vycheslav Arkhangeskii (Director General) and Alexander Slovensky (First Deputy Director General); Shimadzu’s Peter Prentki (Sales Manager); and Vital Images’ Marc Lamont (Managing Director, Europe) and Michael Carrel (President and CEO).
Israel showcases tomorrow’s imaging tools

By Paula Gould

Delegates caught a glimpse of the future of radiological technology at Sunday’s ESR meets Israel session. Israel may be relatively a small nation – with a population of just seven million – but it is making an important contribution to innovation. About 900 companies are developing new pharmaceuticals, medical devices, and healthcare IT products. The majority of these businesses are relatively young and are supported by venture capital funding.

“As a nation, Israelis have a strong entrepreneurial spirit,” said Dr. Yael Inbar, radiologist at the Sheba Medical Center, Tel Hashomer, Israel.

As evidence of this activity, Inbar showed how Israeli-grown technology could find a place in operating rooms of the future. One such innovation is a 0.12T MRI system that may be used for intraoperative imaging. The compact, C-arm scanner has been designed to provide neurosurgeons with high-quality 3D images of the brain. It offers near-real-time control over navigation and resection, and has been optimised for use in any conventional neurological operating suite. Images acquired with this system in the operating theatre may prevent surgery from being halted prematurely.

Inbar also introduced delegates to an ultra-high resolution cryosurgical device, which has been approved by the US Food and Drug Administration for the treatment of prostate and liver cancers. The system uses 1.5 mm needle probes to freeze localised tissue. Cryosublation may also be carried out under MR guidance with slightly larger (2–3 mm), MR-compatible probes.

“This system came from technology developed by the military that was used to cool missiles,” she noted.

Another Israeli-grown innovation for radiology is the EndoScout tracking system. This technology works with the gradient fields of MRI scanners. It is easily installed and requires no pre-registration. Inbar commented. Possible applications for this tool include radiofrequency ablation in the liver, spinal cyst drainage, brain biopsy, breast biopsy and kidney cryotherapy.

Inbar concluded her presentation by discussing an MR-guided focused ultrasound device. “The idea of using ultrasound to heat and ablate tissue is not particularly new. The novelty is its combination with MRI,” she commented.

Three-D images enable the target lesion to be located precisely. Visualisation of the beam path means that treatment can be controlled. Real-time temperature feedback is possible through MR thermometry. The success – or otherwise – of ablation may then be determined from a post-therapy, contrast-enhanced MRI scan.

EIBIR launches Research Fund at ECR 2008

At this year’s ECR, the European Institute for Biomedical Imaging Research (EIBIR) has enjoyed its prominent booth in the entrance hall of the conference centre, allowing it to reach a huge audience and present the remarkable progress the network has made since its establishment in early 2006.

The aim of EIBIR is to create a pan-European network of research institutes in order to enable synergies in biomedical research, to spread good practice and to promote common initiatives. EIBIR is an inclusive organisation that is open to research institutions from all over Europe and beyond, and currently boasts over 200 member institutions, including both clinical departments and research laboratories.

The ECR represents an ideal platform to disseminate information on recent EIBIR activities and on projects initiated or coordinated by EIBIR that received funding from the European Union in the course of the 6th and 7th framework programmes.

The EIBIR Research Fund was launched at this year’s ECR, in line with EIBIR’s mission to coordinate and to foster research training within Europe. Contributions to the Research Fund can be made by individuals and institutions. Donations will be used to support research training in the field of biomedical imaging in order to disseminate knowledge and to secure attainment of the ultimate goal of improving diagnosis, treatment and prevention of disease. EIBIR would like to thank those who were among the first to make a donation and will ensure that the funds will be used to the benefit of the future of radiology in Europe.

Information on the fund and the possibility of donating online will be available shortly at the EIBIR website www.eibir.org, with regular updates on the use of the donations received. The EIBIR Office can be reached at office@eibir.org.

Walking through the ECR technical exhibition is always a source of wonder and inspiration for technology-hungry congress attendees. But as they stroll through the newest and most innovative models of CT and MRI equipment, one device in particular might grab their attention.

Red and sleek, a Ducati Desmo 16, ‘La Desmodedici’, proudly stands at the front of the Esaote booth in Expo A. “This is the original one, the one that won the Motorcycle World Championship last year!” said Fabrizio Landi, the enthusiastic general manager of Esaote.

Fine, but that doesn’t explain what a motorcycle is doing in the middle of a radiological congress, posing like a figurehead at the front of an industry booth. “Like Esaote – an Italian middle-sized group that has the will and the potential to compete against the big ones,” he said.

Yet another Israeli-grown innovation for radiology is the EndoScout tracking system. This technology works with the gradient fields of MRI scanners. It is easily installed and requires no pre-registration, Inbar commented. Possible applications for this tool include radiofrequency ablation in the liver, spinal cyst drainage, brain biopsy, breast biopsy and kidney cryotherapy.

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Prof. Gabriel P. Krestin, EIBIR Research Committee Chairman and ESR representative in the EIBIR General Meeting, inaugurates the EIBIR Research Fund.

All revved up and nowhere to go

By Mélisande Rouger

Ups and downs on the Slovenian slopes

By Julia Patacci

“Another important operation was necessary due to an extreme deterioration in his general situation and a threat of a saddle,” said Austrian vascular specialist Dr. Thomas hölenrein after the operation, which was carried out in Oslo.

Lanzinger’s compatriots decided that the most effective therapy for his vascular problem would be to carry on and give their best in the remaining races. They also committed themselves to donate their prize money to his injured colleague.

In Saturday’s giant slalom event in Kranjska Gora, Slovenia, No. 1 skier Benjamin Raich missed the top three by just 0.24 seconds. American Ted Ligety finished first, beating the Italian duo Manfred Möllg and Massimiliano Bardone.

Sunday’s slalom again at Kranjska Gora offered the Austrian team the next opportunity to raise some funds for their injured colleague, and this time victory was even closer, when Austrian Marcel Hirscher, aged only 19 and slalom World Junior Champion, took third place.

Top position went to Manfred Mölg, who beat Croatian Ivica Koseljic by 0.41 seconds. Jean-Baptiste Grange from France finished fourth, defeating Austrian Reinfried Herbst, German Felix Neureuther, and Ted Ligety. Grange, who has won three races this season, leads the slalom standings with 312 points ahead of next Saturday’s final in Bormio, Italy.
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Visit us at ECR EXPO A: Booth #103
Harry’s Hot Shots from Day Three

Sunday may be a day of rest for many people, but this was not the case for ECR Today’s multi-talented photographer, Harry Schiff er. Once again, we asked him to tour the Austria Center and capture some of the action at the congress. Here’s a selection of what he saw yesterday.

The American Association for women radiologists provides a forum for issues unique to women in radiology, radiation oncology and related medical professions.

Deciding which session to attend can take a while, but don’t let the grass grow under your feet.

Every vantage point was taken outside of the Austria Center during the breaks between sessions.

It’s a beautiful day outside, apparently …

Lost in translation? The weighty abstract book requires careful study.

The Korean Radiological Society is hosting the 12th Asian Oceanian Congress of Radiology in Seoul later this year.

Top up your vitamin levels at the fruit stand on the 1st level. Choose from a variety of freshly squeezed drinks or one of the chopped fruit snacks.

The Women’s Health Days were another ESR activity to raise public awareness of the role of imaging.

The Iranian Radiological Society is one of many national associations present at ECR 2008.
Open your eyes to a whole new day in ultrasound. Because at the core of our LOGIQ® family of ultrasound systems is TruScan™, our revolutionary imaging platform. With TruScan, ultrasound data is digitally acquired and stored in its raw-data format. Which means you can continue to access and adjust the data long after the patient is gone. Minimizing patient stress and maximizing productivity with quick scans and easily manipulated raw data. It’s the ultrasound you’ve been looking for. Ultrasound Re-imagined.

Visit GE Healthcare at ECR EXPO B, Booth No. 202 & 211
To learn more visit www.gehealthcare.com/re-imagine
Ultrasound manufacturers strive to improve patient care with product innovations

By John Bonner

One of the world’s smallest portable scanners, a new approach to three-dimensional imaging, an award-winning convertible platform, and a novel method for detecting deep body tumours are among the many ultrasound highlights on show in the technical exhibition at ECR 2008.

Hitachi Medical Systems is unveiling its real-time tissue elastography technology on the company’s range of Hi Vision ultrasound scanners. This is described as a second-generation ultrasound modality for the assessment of tissue elasticity. Although the technology is new, the idea behind it is centuries old. Palpating tissue to investigate its stiffness is one of the oldest diagnostic procedures, first described by Hippocrates, who lived between about 460 and 370 BC. Knowing that a tumour becomes palpable when its hardness becomes greater than the surrounding tissue, physicians in Ancient Greece used manual palpation to determine the size, shape, and even the malignancy of the lesion.

Elastography imaging is an emerging diagnostic tool that uses ultrasound to measure the response of tissue to stress. As a result of the large contrast in stiffness that often exists between the cancer and normal tissue, even small lesions can be identified on elastography.

The strain image is calculated and displayed as a colour overlay of the conventional B-mode image, the stiffer structures being displayed as blue areas while the more easily deformed tissues are displayed in red. Clinical evaluation has shown that lesions can be characterised more rapidly and with a higher degree of confidence when elastography is incorporated into the conventional ultrasound examination, according to Hitachi. The technology is available with more than 20 transducers, and is of diagnostic value in a variety of clinical areas, including breast, urology, and via an endoscopic approach to the pancreas and lymph glands.

California-based Zonare Medical Systems is heading east with its z.one ultrasound system, which was recently awarded the title of the best handheld ultrasound unit by the United States medical technology analysts, KLAS. The device is a cart-based system that users can convert into a compact device to optimise its value in a range of clinical settings and without sacrificing image quality or performance.

The company says its software-based architecture allows the unit’s performance to continue improving as greater processing power becomes available. System upgrades can be downloaded via the internet, allowing for advances in clinical capabilities and enabling users to cost-effectively maintain a state-of-the-art ultrasound system, it states.

In one newly launched example, Zonare has introduced an obstetric calculations package. This upgrade includes nuchal translucency, nasal bone length, cerebellar diameter, humeral, radius and ulna, and fetal fibula measurements. As a new hardware feature, the latest machines will include a new DVD burner archive capability.

Meanwhile, GE Healthcare is showcasing its Logic Care Area Series ultrasound systems, which are customised to particular areas needing three-dimensional imaging, such as paediatric, vascular, and breast. These applications provide results in, for instance, newborns needing ventricular volume measurements of hydrocephalus, elderly patients requiring real-time ultrasound of the haemodynamics of a pseudoaneurysm, and women undergoing ultrasound examinations of breast lesions.

Logiq is based on GE’s raw data approach to ultrasound imaging. Instead of storing images as video pixels, data are kept as digitised ultrasound waveforms. The company says that this gives extremely high ultrasound fidelity and allows data to be captured in three dimensions in near real time.

This makes ultrasound much like CT and MR in that clinicians, regardless of care area, can view, reprocess, re-slice, and review images even after the patient has left the hospital or clinic, according to GE. This ‘tomographic-type’ ultrasound technique gives users...
access to parallel slices through the captured data. In addition to providing new access to ultrasound views, this approach could be a better match to the MR and CT department workflow, which may drive departmental efficiencies.

Small hand-held ultrasound devices may lack the stunning image quality and data processing capability of the cart-mounted scanners, but they are making steady progress.

Siemens will be demonstrating an ultrasound unit that weighs only 700 g, is about the size of a mobile telephone, and fits neatly into the physician’s pocket. The Acuson P10 device is intended for use in those situations far away from the relative calm of a hospital radiology department, where instant decisions can make a real difference to the patient’s survival chances. The device is designed for the sort of emergencies dealt with by outpatient departments, rescue helicopters, and intensive care units.

It is reportedly easy to operate, and when set to high definition ultrasound image acquisition, it can, for example, be used to evaluate heart action, display any damage to the arteries, examine the pelvis, and detect accumulations of liquids in the body. In obstetrics, it can even be used during childbirth to determine the location of the foetus, the chances of survival and position, and to visualise the amount of amniotic fluid or bleeding.

Among the other cutting-edge technologies that are on show in the exhibition is Vision 2008, the latest upgrade by Philips Healthcare to its iU22 ultrasound system. This offers expanded volumetric capabilities, new imaging solutions for technically difficult patients, new interventional tools, and new approaches to improve workflow efficiencies.

The C5-1 curved array transducer raises the quality of imaging available in patients undergoing abdominal, obstetrical, gynaecological, and interventional procedures, according to the vendor. It combines the proven performance of the company’s PureWave crystal technology with enhancements in tissue aberration correction, and coded beam-forming.

On the Esaote stand, ECR participants can find out more about the MyLab ultrasound product line. This includes the MyLab70XVG unit, which can be fully integrated with the Virtual Navigator technology. This is described by Esaote as a revolutionary modality that provides real-time fusion of ultrasound and CT/MR imaging.

At the Philips Healthcare booth, details are available about Vision 2008, the latest upgrade to its iU22 ultrasound system.

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**Technical Exhibition**

**Opening hours:**

Mon: 10:00–18:00

**Booth #543 Expo E**

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Automatic referral of patients with back pain to MRI makes neither economic nor clinical sense

By Paula Gould

Days spent sitting in lecture theatres and seminar rooms, long hikes from scientific sessions to the exhibition hall, and a weighty conference bag under one arm and a laptop putting the final touches to the next day’s presentation … It could be argued that ECR is a recipe for backache.

Back pain is an extremely common complaint at GP’s clinics and a frequent reason for people being absent from work. In many cases, the reason for the pain will be mechanical, rather than a serious underlying medical condition. Approximately 80% of people presenting with acute back pain for the first time will be pain-free within six weeks, whatever treatment is prescribed.

Not all back pain sufferers can be dismissed so easily, though. Joint stiffness, spasms, and ongoing discomfort may be due to infection, malignancy or degenerative disease, and not bad posture or poor lifting technique (or attendance at an annual conference). It is this group of patients that warrants further investigation on imaging, with a view to providing a rapid and accurate diagnosis.

Given the wide spectrum of spinal disorders, deciding which patients to refer to imaging is no simple task. Monday afternoon’s European Excellence in Education session, ‘The imaging management of back pain,’ will explain how this can be achieved. The interactive nature of the session will also reveal whether the audience is ready to put that theory into practice.

When faced with a patient complaining of back pain, doctors may be tempted to simply refer them for an MRI examination. Aft er all, MRI can illustrate the anatomy of the spine with exquisite detail. Why not take advantage of this as a general, first-line screening tool? Such a strategy is neither cost-effective nor clinically effective, according to Dr. Victor Cassar-Pullicino, radiologist at the Robert Jones and Agnes Hunt Orthopaedic and District Hospital in Oswestry, UK.

A patient’s clinical symptoms and medical history should be the starting point when considering an imaging referral, he explained. Certain ‘red flag’ signs are particularly important. For example, if a patient who had previously been treated for breast cancer presents with acute back pain – or if the patient has reduced power in one leg, lost a lot of weight, or is suffering from sphincter problems – then he or she should be investigated urgently.

“Patients who complain of back pain should also be taken seriously,” Cassar-Pullicino said. “Early assessment of stroke on imaging is acknowledged to be critical, and such examinations can be performed on a range of different modalities. The question is: which do you choose? Delegates will be presented with the benefits and drawbacks of CT, CT angiography, CT perfusion, multimodal MRI, and digital subtraction angiography. Criter- ria used when referring patients for further treatment will also be discussed.”

Whatever approach is taken, it is critical that radiologists can link what they see on imaging to the patient’s symptoms, he explained. Detecting an abnormal signal on MRI, for instance, is only the first step. Determining whether that abnormality corresponds to degeneration, infection or past trauma is another matter altogether.

The relationship of imaging signs to clinical symptoms is likely to become increasingly important as the number of elderly patients in doctors’ waiting rooms grows. An MRI of an 85-year-old’s spine will almost certainly reveal extensive degeneration, but these signs of wear-and-tear may not be the root cause of a patient’s pain.

“Is this really where the radiologist comes in,” Cassar-Pullicino said. “It is not so much about identifying whether there is or isn’t disease, it is more about correlating those imaging signs with clinical symptoms. Because the last thing you want to do is to recommend surgery for these patients simply on the basis of an imag- ing abnormality!”

Audience participation will also be required at the earlier European Excellence in Educa- tion session, ‘The imaging management of stroke’, which begins at 10:30 on Monday. Eas- ily assessment of stroke on imaging is acknowledged to be critical, and such exami- nations can be performed on a range of dif- ferent modalities. The question is which do you choose? Delegates will be presented with the benefits and drawbacks of CT, CT angiography, CT perfusion, multimodal MRI, and digital subtraction angiography. Criteria used when referring patients for further treatment will also be discussed – and then tested.

Another European Excellence in Education session, to be held on Monday from 16:00 to 17:30, will focus on the imaging of cirrhosis and portal hypertension. A selection of case studies has been prepared so that the audience can be quizzed on likely diagnoses. Attend- ees will learn about the pitfalls to be aware of when making such assessments in clinical practice, for example, the misidentification of fibrosis as tumour.

### E³ – European Excellence in Education Interactive Teaching Sessions

**Monday, March 10, 10:30–12:00, Room E2**

- **E³ 1420 The imaging management of stroke**
  Moderator: P.M. Fanestil; Antwerp/BE
  A. Rosser-Grattage; Baruchina/ES
  I. Krings; Aachen/DE

**Monday, March 10, 14:00–15:30, Room E2**

- **E³ 1520 The imaging management of back pain**
  Moderator: D.J. Wilson; Oxford/UK
  V.N. Cassar-Pullicino; Oswestry/UK
  F. Aparisi; Valencia/ES

**Monday, March 10, 16:00–17:30, Room E2**

- **E³ 1620 Traps in imaging of cirrhosis and portal hypertension**
  Moderator: M. Goebell; Baruchina/ES
  Y. Menu; Le Kremlin-Bicêtre/FN
  A. Beam; Ankara/TR

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T1-weighted MRI (A) and T2-weighted MRI (B) of a patient who presented with acute back pain. The patient also had neurological dysfunction in the lower limbs and sphincter disturbance (both “red flags”). Imaging revealed prostatic metastatic disease at L2, causing cauda equina compression. Note fewer deposits in the T12, L1 vertebrae. (Provided by Y-Cassar-Pullicino)
MRI and CT make progress in detecting and characterising liver tumours

By Jane Qiu

The liver is the main site for metastases from different cancers, particularly in patients with colorectal tumours. It is also frequented by other lesions, such as benign cysts or haemangio-
giomas in about 20% of the population.

“It’s crucial to detect those lesions, classify them, and determine their locations, as well as the stage of tumour development, so that appropriate therapies can be applied,” says Prof. Ernst Rummeny, of the department of radiology at the Technical University of Munich (TUM). “Imaging is an important, noninvasive first-step examination approach.”

As chairman of Monday afternoon’s special focus session, ‘Frontiers in liver imaging’, Rummeny thinks the lectures will help to advance delegates’ technical knowledge and interpretation skills and put forward optimal strategies for different clinical scenarios.

“Differences between various types of lesions can be quite subtle,” acknowledged Rummeny. “That’s the art that will be taught in the session. One learns to find clues to differentiate them.”

The symposium will feature Prof. Jochen Gaa, also of the TUM, who will illustrate the applica-
tions of MR in detecting and characterising liver tumours. MR has a very good soft-tissue contrast and is highly sensitive for subtle morphological changes, he explained.

The speed of image acquisition by MR has improved markedly.

“We can now do 20 slices with one single breath hold, covering the entire liver, com-
pared with only a couple of slices 15 years ago,” he said. “This major breakthrough has removed breathing artefacts commonly asso-
ciated with imaging large organs.”

The developments of stronger gradient hard-
ware and multiphase-array technologies have also increased the signal-to-noise ratio and allowed for thinner slices, faster pulse sequences, and better image quality.

Another factor responsible for increasing applications of MRI in tumour diagnosis is the development of diffusion-weighted MR, a technique imported from neuroimaging. It gives rise to a new type of contrast based on mobility of protons in tissues, Gaa explained.

On the one hand, tumour tissues tend to have higher cell density than their normal counter-
parts, where the movement of protons is more restricted. On the other, some lesions such as cysts contain water, and protons can move freely. Detecting lesions with a diameter of 3–4 mm then becomes feasible.

The main challenge for MRI is to improve the pulse sequences, making it even faster and enhancing contrast and resolution. The trend is towards field strengths of 3T or more, which gives rise to stronger signals and thinner slices so that even smaller lesions can be detected. However, higher magnetic fields may be asso-
ciated with more artefacts, so it is a trade-off, he said.

Conversely, Prof. Filipe Caseiro-Alves, a radi-
ologist at the Faculty of Medicine, University of Coimbra in Lisbon, thinks that the strength of CT in the liver lies in its high spatial resolu-
tion and increasing speed.

“The multislice CT field has progressed rapidly in recent years,” he said. “The slices are getting much thinner too, reaching less than 1 mm.”

The technology is crucial for studying changes in the vascular system of the liver – its arterial and portal components – which is an impor-
tant aspect of liver pathology, said Caseiro-
Alves. It can scan the whole liver in 5–8 sec-
onds, but multislice CT protocols need to be followed with care and attention.

CT is normally used for follow-up studies after treatment because it is cheaper and faster than MR, said Gaa. Compared with MR, CT covers bigger areas, and each scan also exam-
ines other organs, such as the lung and pelvis, which helps to assess whether the patient has responded to treatment.

“CT is particularly powerful in perfusion stud-
ies for assessing the efficacy of therapies that target angiogenesis,” said Caseiro-Alves, add-
ning that there is a linear relationship between enhancement and the density of pixels in CT images. “Such a direct relationship is lacking for MR, and so the correlation is more com-
plicated”.

The session will also feature Prof. Philip Robin-
son, of the department of diagnostic radiology at St. James’s University Hospital in Leeds, UK, who will explain how various contrast agents specific for liver imaging can help to detect and differentiate small lesions using MR.

It will conclude with a presentation by Prof.
Pablo Ros, of Hospital de la Santa Creu i Sant Pau in Barcelona. He will discuss the correla-
tion between histology and imaging based on his extensive experience at the Armed Forces Institute of Pathology in Washington DC, which has one of the largest collections of his-
tology files in the world.
Elastography and 3D imaging can help overcome breast ultrasound’s pitfalls

By Emily Hayes

The ACRIN 6666 trial results, released in late 2007, showed that when breast ultrasound is added to the initial breast screening protocol for high-risk women, 30% more can-
cers can be detected, albeit at the cost of more false positives. Improved
cancer detection rates have also been
demonstrated in other trials.

Based on positive trial results, Europe could see an increase in breast ultrasound study volume because it is being used increasingly to supplement mammography, said Dr. Giorgio Rizzatto, head of diag-
nostic imaging at Servizio di Radiolo-
 gia Ospedale Civile in Gorizia, Italy.

"We need to change our screening programmes. We need to provide more opportunities to women with risk factors and dense breasts to get an ultrasound scan," said Rizzatto, a presenter at the refresher course. "We really expect a huge increase in breast ultrasound demand. If we increase the number of examina-
tions and the time we spend on the studies, we will need new technolo-
gies, such as whole breast ultrasound examinations.

"Elastography can be very useful in distinguishing benign from malig-
nant lesions. It can significantly reduce the number of false posi-
tive biopsies," she remarked. "This tool is particularly useful for small lesions under the size of 1 cm. Class-
ical features are less pronounced in small lesions, so the accuracy of evaluation on b-mode imaging is much lower."

About one-third of lesions currently fall into ‘probably benign’ categories for screening and diagnostic cases, but only 6% to 10% may be malign-
ant. Experts in the United States have suggested that the number of false positives may be reduced if BI-
RADS (Breast Imaging Reporting and Data System) is applied strictly.

"Elastography due to desmoplasia around malignancies may appear to be larger on elastog-
raphy than on conventional b-mode images. Experts think that malignancies may appear to be larger on elastog-
raphy due to desmoplasia around the lesion, she said.

"Elastography is high in accuracy in small lesions, so the accuracy of evaluation on b-mode imaging is much lower."

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tive biopsies," she remarked. "This tool is particularly useful for small lesions under the size of 1 cm. Class-
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In his talk, Rizzatto plans to review the role of ultrasound relative to mammmography and MRI. He also will demonstrate good ultrasound technique, helping to ensure practi-
tioners pick up on the vascularity of breast lesions.

Breast ultrasound has traditionally played a bigger role as a supplementa-
tional technique in Europe compared to the United States, he noted. Biopsy costs and false positive rates tend to be lower in Europe, but there are still concerns about women undergo-
ing biopsies unnecessarily and about missed malignancies.

Europe is facing a huge increase in medical litigation in breast imag-
ing and the cost of a missed lesion is high, said Rizzatto. On the other hand, women are not satisfied when they undergo unnecessary interven-
tions to investigate findings that turn out to be false positives.

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The problem of building Computer Aided Diagnosis software for automatic breast cancer detection and differentiation in Contrast Enhanced MR images is a great challenge where the complexity of four-dimensional data adds to the already difficult task of finding characteristic patterns in the image.

The software was built using an originally developed image processing framework under the paradigm of minimal workflow disruption: a fully automatic Computer Diagnosis System able to pre-process contrast-enhanced MR images, and detect and classify contrast-enhanced lesions in order to expedite and standardise the diagnosis of cancer and help reduce unnecessary biopsies.

System Description – Image Processing Pipeline

The presented Software System processes a pipeline (Image 1) of different methods of image retrieval, pre-processing, segmentation, feature extraction and classification of contrast enhancing lesions. It functions as DICOM send-destination and processes all images without any user interaction. At the end of the black-boxed processing pipeline, a structured report containing all image findings is presented to the intended recipient via printer or e-mail and can be used as quantitative decisional aid and a structured reporting tool.

For pre-processing, a 3D non-rigid, mono-modal registration algorithm compensates motion during the course of the investigation (Image 2).

The next step is represented by the segmentation of contrast-enhancing objects by means of unsupervised clustering followed by a region growing to serve as border correction. All segmented objects are considered regions of interest (ROI) and are further investigated by extracting morphology, texture and kinetic parameters to be used as components of a feature vector, fed to a classification step, differentiating artefacts or lesions (detection) and benign or malignant lesions (diagnosis).

The results of image processing are summarised into DICOM files and a structured report XML file viewable on a standard web-browser. Registered subtracted images and colour overlays are sent back into the PACS. The structured report documents on a lesion basis through a standard lexicon (currently BIRADS) and quantitative information morphology and dynamics of each identified object.

Results

The accuracy of the automated steps was tested. CADMRM software prototype was tuned, in a k-fold validation, with n=157 patients with gold standards (99 malignant tumours, 58 healthy: 35 benign tumours and 23 investigations without any tumour). All ‘gold standard’ tumours have been histologically verified by core biopsy or operation.

A mean of 4.1 additional lesions (false positives) per whole MRM investigation were marked within the final software report. A sensitivity and specificity on a patient basis are 0.89 and 0.84 respectively (Figure 1).

A mean of 4.1 additional lesions (false positives) per whole MRM investigation were marked within the final software report.
Researchers predict bright future for molecular imaging

By Jane Qiu

The growing number of studies involving angiogenesis and cellular therapies is contributing to the development of new tools and techniques for revealing ever more microscopic details. Traditional ways of imaging have their limitations in this area, and the challenge may be best met by combining different imaging modalities, according to Dr. Frank Berger of the Department of Biological Regulation, Hebrew University Heidelberg, Germany, who will discuss the latest developments at the Weizmann Institute of Science in Rehovot, Israel, who will discuss the latest developments at the Weizmann Institute of Science in Rehovot, Israel, who will discuss the latest developments.

Angiogenesis is involved in many diseases, ranging from wound repair and infertility to cancers, and having an effective way of imaging this process can greatly aid clinical diagnosis, noted Neeman. In addition, this is important for studies of drugs designed to either enhance or suppress angiogenesis.

At the early stage of pathological changes in angiogenesis, the patency of blood vessels is often disrupted, leading to leakage of materials from the blood stream and accumulation of tissues.

"The leakage can be highlighted in MR images," explained Neeman. "MR is able to uncover tissues' structural changes and can be sensitive, added Neeman. Also, the approach does not provide quantitative information on the level of enzymatic reaction because the signal changes are also affected by the distribution of the contrast. In addition, the safety of those targeted contrast materials need to be tested.

"It's still early days," Neeman said. "Clinical applications are a long way off."

Dr. Roland Haubner, of the Nuclear Medicine Clinic at the Medical University of Innsbruck, Austria, will present his latest work on the development of radiological tracers for imaging angiogenesis using modalities such as PET and SPECT. A group of the tracers are derived from peptides containing the amino acid sequence Arg-Gly-Asp (RGD), they bind with high affinity to αvβ3 integrin, which mediates the migration of activated endothelial cells during vessel formation. Thus, after radiolabelled RGD peptides are injected into the blood stream, they would bind to αvβ3 integrin, providing a quantitative measure of its level of expression.

Recognising the complementary feature of different imaging approaches, Neeman thinks that the future of molecular imaging belongs to the world of multi-modality systems that can offer resolution and sensitivity, as well as quantitative information, on molecular changes.

Molecular imaging of hyaluronidase activity by MR. Left: Schematic diagram of the degradation of hyaluronan, a component of extracellular matrix, by tumour-derived hyaluronidase, thereby converting the antiangiogenic precursor to its proangiogenic fragments such as Hyal-2. Centre: The activity of hyaluronidase can be detected using quenched contrast media with low relaxivity that are activated by enzymatic degradation. Right top: In vivo analysis of the activation of the MRI contrast media by an ovarian tumour in a mouse. Right bottom: In vitro MRI analysis of the activity of hyaluronidase secreted by human ovarian carcinoma cells. Adapted from Shifman and Neeman. Contrast Media and Molecular Imaging, 1: 308-312 (2006)
European Society of Thoracic Imaging (ESTI)

By Prof. Philippe A. Grenier, Paris/FR
President of ESTI

The concept of creating a European society to promote education and research in the specialty of thoracic imaging emerged from a small group of European chest radiologists who met together in Grenoble in 1992. These people defined the objectives of such an organisation, and the European Society of Thoracic Imaging (ESTI) was officially founded in 1993 in Luxembourg on the occasion of the founding meeting, presided over by Prof. Robert Dondlinger.

Since then, the main activities of the Society have been concentrated on an annual meeting held in June in the country of the Society President. The scientific programmes of such meetings have included most advances in imaging techniques and scientific knowledge for chest diseases, and CME programmes have been delivered by the best European faculties in thoracic imaging.

The fields of interest of chest radiologists have evolved over the years with the development of different imaging techniques. High-resolution CT, then helical CT, and more recently thin-section MDCT, providing assessment of the entire chest during a single breath hold with a volumetric high-resolution data set, have contributed to better understanding and clinical assessment of focal or diffuse airway diseases and diffuse infiltrative lung diseases. Helical CT angiography of the pulmonary arteries became the primary clinical diagnostic tool for the depiction and management of thromboembolic diseases.

Functional imaging using CT and MR is a new concept permitting evaluation of regional differences in disease severity. Dynamic MDCT and MRI may be used to assess regional lung perfusion. Helium 3 MRI has proved to be useful as a research tool for regional evaluation of normal and diseased lung ventilation.

New post-processing techniques after volumetric high-resolution MDCT acquisitions provide quantitative assessment of lung volume and airway dimensions. They also permit mapping and quantitative assessment of the extent of emphysema and small airway diseases. Assessing airway wall remodelling using CT may be a more sensitive input on clinical trials and ultimately in clinical management of individual asthmatics or COPD patients.

Cardiac imaging has induced a new interest in the heart among chest radiologists. Some non-specific respiratory symptoms such as dyspnoea at exertion, hemoptysis or atypical chest pain may have an important underlying cardiac cause or association that is not clinically obvious. The detection of interstitial oedema can lead to the discovery of previously unsuspected cardiomyopathies affecting the left ventricle.

In patients with thoracic malignancy, invasion of the pericardium, pulmonary veins or left atrium must be precisely described to influence the surgical decision between extra- and intra-pericardial resection. Chest radiologists need to know the cardiac consequences of respiratory diseases and understand lung and heart co-morbidity. ECG-gated MDCT and MR may be used to assess the cardiac structures in patients with extensive parenchymal lung abnormalities and can estimate right ventricular function and pulmonary artery pressure.

This is particularly important in patients with chronic thromboembolic disease or in non-embolic pulmonary hypertension, and in patients with severe COPD. Because COPD is a chronic inflammatory systemic disease, it is often associated with coronary artery disease. Those COPD patients undergoing thoracic surgery may have unsuspected coronary artery disease that can be detected in the course of preoperative evaluation by CT.

All these new topics will be highlighted at the next and 16th annual ESTI meeting (Nice, May 31 – June 1, 2008).

Like the other European subspecialty societies in radiology, ESTI 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 chest. Several years ago, ESTI started to cooperate with the Fleischner Society (FS), an international fellowship of physicians and scientists dedicated to advancing knowledge of the normal and diseased chest. ESTI and FS had two joint meetings in 2012 and 2007. In addition, five societies (Korean and Japanese Societies of Thoracic Imaging, Society of Thoracic Radiology, FS and ESR) jointly held the first world congress in thoracic imaging in Florence in 2005. According to the exceptional success of this meeting, the experience will be repeated in 2009 in Valencia.

In the future, because of the arising interest of chest radiologists in understanding and assessing the heart, ESTI should move closer to the European Society of Cardiac Radiology (ESCR).

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Answers for life.
Women in Radiology Part 4

By Mélisande Rouger

Dr. Erika Denton is a consultant radiologist at the Norfolk and Norwich University Hospital, UK, where she was the Director of Breast Imaging until 2003. Aged 42, she is the National Clinical Lead for Diagnostic Imaging at the Department of Health, the Medical Director of the PACS Programme, with a seat on the Clinical Executive at Connecting for Health, and one of the Vice Presidents for the UK Radiological Congress in 2009.

ECRT: In Europe, the number of female radiology students has considerably increased over the past few years, reaching for instance 60–70% of the current student population in Austria. However, the proportion of female members of the Austrian Radiological Society (ÖRG) is only 203 to 572 male. Do you know what the situation is like in the UK? If it is similar, do you think the new generation will eventually close this gap?

Dr. Erika Denton: In the UK the situation is different. All consultant radiologists have to have fellowship of the Royal College of Radiologists if they train in the UK, and the vast majority maintain their subscriptions to the College and their affiliation to it, whether male or female. I also notice an increase in the number of female radiologists in the UK.

ECRT: In your opinion, how well do European female radiologists contribute to research? Do they contribute as much as their male counterparts, and are they equal to men in the research field?

ED: In the UK there is little difference between female and male radiologists. In my experience they are equal in the research field.

ECRT: In professional life and in science especially, many women observe the existence of a glass ceiling blocking their access to top positions. Do you think this is also the case in radiology?

ED: There is no glass ceiling to accessing top positions for women in radiology in the UK, although there may be elsewhere in Europe.

ECRT: Have you ever been confronted with that situation? Likewise, have you ever experienced sexism at work?

ED: I have experienced sexism at work but not for many, many years. However, as I have a very senior position, my current experiences will undoubtedly be different from somebody starting out in their career.

ECRT: How does the situation in the UK compare with the one in the rest of Europe, in terms of career opportunities, working conditions and salaries for a female radiologist?

ED: I think flexible working is increasingly common in the UK, but the availability of this kind of working practice is very variable across Europe. As teleradiology becomes more widely available, I think women will be at the front of the queue of radiologists wanting to work more unusual hours, so that they are able to combine their domestic and child-care duties with work.

ECRT: There are no differences for the female compared to the male radiologist in terms of career opportunities, working conditions or salary in the UK. The only difference is that many more women choose to work part-time, particularly while their children are small; however the pro-rata pay is the same.

ECRT: For numerous working women, balancing private and professional lives is a major issue, especially when children are involved. A pragmatic solution seems to be more flexibility in working hours. Do you think the UK, and more generally Europe, offer women the flexibility they need to efficiently manage work and home?

ED: Do you have children? If so, how well do you balance your life between home and work?

ED: I have six children aged 6, 8, 11, 13, 14, and 16. I have a delicate balance between home and work and rely heavily on others for support; both paid help and unpaid support from my mother. My husband contributes as much as I do domestically or this balance would not be possible.

ED: I do not know of any male radiologists who have slowed down their career to do this.

ECRT: Do you have any role models in the profession? Do you think it is important for women to have female role models in their profession?

ED: I have six children aged 6, 8, 11, 13, 14, and 16. I have a delicate balance between home and work and rely heavily on others for support; both paid help and unpaid support from my mother. My husband contributes as much as I do domestically or this balance would not be possible.

ED: I do not know of any male radiologists who have slowed down their career to do this.

ECRT: Do you have any role models in the profession? Do you think it is important for women to have female role models in their profession?

ED: There are few female role models at the top of the radiology profession.

ED: I think flexible working is increasingly common in the UK, but the availability of this kind of working practice is very variable across Europe. As teleradiology becomes more widely available, I think women will be at the front of the queue of radiologists wanting to work more unusual hours, so that they are able to combine their domestic and child-care duties with work.

ECRT: How aware are your male peers of the double challenge that female radiologists face when they are mothers?

ED: I think my male peers vary in their ability to understand the challenges of combining motherhood and full-time employment. Some have a great understanding as their partners also work, but those who have ‘stay-at-home’ partners often have no understanding at all of the challenges faced by doing both jobs.

ECRT: Do you know male radiologists who slow down their career so as to spend more time with their family?

ED: How aware are your male colleagues of the double challenge that female radiologists face when they are mothers?

ED: I think flexible working is increasingly common in the UK, but the availability of this kind of working practice is very variable across Europe. As teleradiology becomes more widely available, I think women will be at the front of the queue of radiologists wanting to work more unusual hours, so that they are able to combine their domestic and child-care duties with work.

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ESSR anticipating the future
By Apostolos Karantanas, Iraklion/GR
ESSR President

Musculoskeletal (MSK) imaging is a large and rapidly developing subspecialty of radiology. Medical imaging technologies are finding a growing niche in MSK radiology for both diagnosis and treatment planning, as well as for monitoring the effectiveness of treatment. MSK radiology is witnessing exciting innovations in all its branches, including conventional radiology, cross-sectional imaging and molecular imaging. The plain radiographs can now be manipulated digitally.

Ultrasonography allows the use of contrast media and, with newer techniques, provides novel information such as elastography (Fig. 1). Multidetector computed tomography (CT), with its multiplanar reconstruction and speed in whole-body imaging, is a powerful weapon in evaluating MSK trauma. Last but not least, high-field magnetic resonance imaging (MRI) scanners with improved coil technology are able to provide additional information on bone structure (Fig. 2).

As a consequence, MSK imaging methods are becoming more and more valuable in clinical practice. Computer science has made significant contributions to the expansion of this subspecialty. The filmless department is becoming popular as it is beneficial for the environment, while the easy long-distance transfer of high-resolution images has changed the way in which radiologists communicate and work. Traditionally, MSK imaging has been a morphological subspecialty mainly used by orthopaedic surgeons and rheumatologists, but currently it is becoming a physiological tool for understanding and managing various disorders. New techniques – such as diffusion-weighted imaging and spectroscopy – have enhanced our ability to understand data that are not provided morphologically. Positron emission tomography (PET)/CT and, in the near future, PET/MRI will deliver further contributions in this area. In addition, innovative interventional procedures – such as bone augmentation, intradiscal therapies for discogenic pain, thermal ablation for treating bone tumours, treatment of vascular anomalies and MR-guided interventional procedures – further increase the clinical role of the MSK radiologist.

There is a growing demand from physicians and patients for updated services in depicting and treating MSK diseases. Updated levels of medical practice, availability and accuracy are important characteristics for a modern radiologist. In the daily operation of an effective and successful imaging healthcare service, the ability to communicate with the referring subspecialists is essential. We need to provide the managing clinicians not with irrelevant minutiae, but rather with practical information that will be critical in creating a treatment plan for their patients. In other words, we all need to speak the same language.

The frequent and constant redirection of medical imaging due to technological advances draws attention to the need for continuous education. MSK radiologists have to stay up to date with the orthopaedics, rheumatology, oncology and sports medicine literature so they can tailor their reports to the specific clinical questions asked. National and international meetings are provided with data from different practices. One of the most important of such meetings is the European Society of Musculoskeletal Radiology (ESSR) Annual Congress, which provides updated information through invited lectures, scientific papers, scientific electronic posters and hands-on ultrasound demonstrations.

ESSR is a fast-growing society with the aim of promoting MSK radiology in Europe, with particular emphasis on education and research. ESSR collaborates with all scientific organisations within its field of interest and is in close co-operation with the European Society of Radiology (ESR). We need to achieve better communication among radiologists and we need more ideas for the harmonisation of European radiology education in a rapidly changing clinical practice. In this respect, any European radiologist with particular interest in MSK imaging is welcome to join ESSR.
EIBIR – European Institute for Biomedical Imaging Research

News from the EIBIR office

By Vera Schmidt

2007 has been a very busy year for the EIBIR office, based in Vienna at the premises of the European Society of Radiology (ESR). This article intends to give you an overview of our activities since ECR 2007.

The database of EIBIR member institutions, which had originally been set up in 2005, has been thoroughly updated in order to include detailed information on fields of expertise, research infrastructure, number of research personnel and amount of funding, as well as a list of the publications of each institute. We would like to take this opportunity to thank all members for their efforts and their support and are confident that the data will be extremely useful in creating synergies and identifying opportunities and resources for joint projects. The information collected has already been integrated into the new password-protected members’ area of the EIBIR website. All member institutions are now able to log on to a restricted area on our website to retrieve detailed information on research activities of other members, in order to facilitate networking activities among them, or just to edit their own institution data. We are happy to say that many institutions have already used this tool. Not a single day passes without updates.

In July, the EIBIR office started with the coordination of the accepted FP6 project, entitled ENCITE – European Network and Modelling – is another project which the EIBIR office will soon be coordinating. Concerned about the project as well as monitoring the work being carried out, the results and the necessary changes to the work plan as a result of those findings, according to project milestones and indicators. The financial administration, distribution of partner shares etc. also lies within the responsibility of the EIBIR office. Therefore we have recruited reinforcements and expanded our team to 3 people.

The European Commission has officially invited EIBIR to start contract negotiations for its large integrated project proposal, submitted to the EU FP7 call ‘HEALTH-2007-1.2-4 In vivo image-guidance for cell therapy’. The project, entitled ENCITE – European Network for Cell Imaging and Tracking Expertise – consists of 21 project partners with leading expertise in the field of cell imaging, with EIBIR as the coordinating partner. The 4-year project will begin in spring 2008. We are looking forward to this exciting new challenge.

HAMAM – Highly Accurate Breast Cancer Diagnosis through Integration of Biological Knowledge, Novel Imaging Modalities, and Modelling – is another project which the EIBIR office will soon be coordinating. Contract negotiations started in February and the project is expected to begin in spring 2008. HAMAM will provide a means to seamlessly integrate the available multi-modal images and patient information on a single clinical workstation. Based on knowledge gained from a large multi-disciplinary database, populated within the scope of this project, suspicious breast tissue will be characterised and classified. The exact diagnosis of suspicious breast tissue is ambiguous in many cases. HAMAM will resolve this using the statistical knowledge extracted from the large case database. The clinical workstation will suggest additional image modalities that may be captured to optimally resolve these uncertainties. The workstation thus guides the clinician in establishing a patient-specific optimal diagnosis. This ultimately leads to a more specific and sensitive individual diagnosis.

One of the activities within the framework of the FP7 project was a training survey among EIBIR members, collecting information on current training topics and requirements as well as on teaching facilities and the willingness to host educational activities at our member institutions. EIBIR members can now announce their training events on the EIBIR website. We thank the 50 member institutions that participated in the survey for their contributions.

Another online service free of charge is the EIBIR Career Forum. Many institutes have already published vacant research positions as well as training positions, and we are hoping that this year even more institutions are going to use this unique opportunity, which is also absolutely free of charge. We hope that this platform will live up the European professional labour market in the field of molecular imaging.

As you can tell, all these projects have kept the EIBIR office extremely busy and there is no breather in sight. We are looking forward to further fruitful cooperation with our partners in 2008. Our special thanks go to the EIBIR Industry Panel; without their splendid support all our endeavours would be impossible.

If you would like to get more detailed information on EIBIR, if you would like to meet the Scientific Director, Prof. Jürgen Hennig, or if your institution would like to join EIBIR, visit the EIBIR lounge during ECR 2008 in the entrance level of the Austria Center Vienna.

www.eibir.org

Join EIBIR and become a member of the European Biomedical Imaging Research network at

A service of the European Society of Radiology
Geriatric tsunami calls for re-think to radiology services

By Paula Gould

The use of imaging on babies, children, and teenagers can require special care and attention. Hence the evolution of paediatric radiology. But just as younger patients place extra demands on radiology services, so do the elderly. This begs the question: does imaging need a new sub-specialty of geriatric radiology?

At first glance, this suggestion may seem to be a joke. Dealing appropriately with frail and vulnerable patients is no laughing matter, though, and the number of elderly men and women requiring medical imaging examinations is increasing. Future radiology services will surely have to change to cater for this growing and demanding patient population. The question is how?

Delegates have the chance to consider possible solutions and strategies in a special focus session, ‘The upcoming ‘geriatric tsunami’ and its consequences to imaging services’. The title reflects the giant wave of elderly patients that will hit European healthcare services in the coming years, as the ‘baby boomers’ reach their 80s and 90s, according to the session’s Chair, Prof. Frode Laerum, professor of experimental radiology at Rikshospitalet University Hospital, Oslo.

“This will be one of the most challenging issues that we will face in the coming years, with many consequences for the organisation of our practice,” he said.

The steady increase in life expectancy means that hospitals are already seeing more elderly patients. Estimates suggest that by 2020 more than 20% of the population will be over 65 years old, compared with 13% in 1990. This demographic shift has obvious implications for healthcare resources. The incidence of dementia, cancer, heart disease, and stroke, for instance, is likely to rise significantly, placing pressure on all diagnostic, therapeutic, and palliative services.

For radiology, the prospect of more geriatric patients raises a number of practical issues. It may not be possible to perform imaging sequences that are particularly sensitive to motion artefacts or require breath-holding. Image-guided treatment options may also be ruled out if the patient is too frail. For example, a 90-year-old patient with colorectal metastases in the liver may simply receive palliative care rather than radio-frequency ablation. Departments may also need to take account of the age of their patients when scheduling examinations.

“You need to give the elderly more time, and remember that some may also be confused,” said Prof. Dr. Olle Elberg, professor of radiology at Malmö University Hospital, Sweden. Patients organisations in Sweden are demanding that hospitals treat the elderly with more dignity.”

Providing effective medical care for this patient population is another pressing issue. Cases of stroke are expected to rise by 50% in Germany over the next few decades, owing to the increasing number of elderly people. Around half of these strokes will affect individuals living in rural areas, who will most likely be treated in a local community hospital, said Dr. Johannes Schenkel, from the neurophysiology and stroke unit, Munich-Harlaching clinical center, Germany. Their lack of access to a specialist stroke centre makes it difficult to provide the rapid, accurate diagnosis that is essential for deciding on the best treatment option.

“You don’t have enough time to transfer these patients from rural areas to stroke centres in the cities, even if you use a helicopter,” he said. “The other problem is that we don’t have the capacity to deal with so many stroke patients in specialist centres. We’re not talking about a handful of cases, but thousands.”

Telemedicine offers a way to bring advanced stroke care to patients who do not live in large cities. This has been demonstrated in the southern part of Bavaria, where a project linking 14 community hospitals with two city-based stroke centres has become an integral part of the region’s healthcare service.

Patients presenting with stroke symptoms at community hospitals will undergo a head CT and/or MRI examination. The results are then transferred at 2 Mb/s over a digital network to one of the stroke centres. The dedicated ‘stroke expert’ who views the images can then communicate with the physician who is examining the patient via a videoconference link.

Elderly patients requiring less urgent imaging examinations could benefit from mobile radiological services. These may be particularly useful for patients living in nursing homes, many of whom suffer from dementia and will find the journey to hospital itself a stressful experience.

Such a scheme has been running in Oslo since September 2004. Beside imaging is provided by a lightweight digital radiography unit, which is transported around the city in a specially adapted car. Digital images are then transmitted directly via wireless broadband internet to the PACS at Ulleval University Hospital, Oslo, or are saved on a USB storage device and uploaded later.

The mobile x-ray service can avoid the expense of ambulance or taxi transport, and clarify whether geriatric patients really do need to be hospitalised, Laerum said. The concept could also be applied to other diagnostic imaging services, for instance, ultrasound, or mobile CT.

“We have to look into other ways of organising healthcare for the elderly,” he noted. “Digital and miniaturised technology now offers a way to take advanced diagnostic services to the patient, rather than taking the patient to the doctor.”
Liver imaging is benefiting considerably from the improvement of ultrasound systems and sequences dedicated to contrast-enhanced examinations. The use of ultrasound contrast to detect and characterize focal liver lesions is now routine.

The above statement is certainly true in centres with trained specialists. Elsewhere, the scenario is somewhat different. Too few radiologists are able to perform contrast-enhanced ultrasound, according to Prof. Jean-Michel Correas, professor of radiology at the Necker Hospital in Paris. They are consequently unable to take advantage of the technique’s growing potential.

Anybody who wants to know more about ultrasound contrast are invited to join Monday afternoon’s refresher course on the topic. Those who do may be pleasantly surprised by what they discover.

“My hope is to demonstrate that this examination is not much more difficult than doing a complete ultrasound survey of an organ, and it can help to quickly answer certain clinical questions,” said Correas, who will be speaking on both current and future clinical applications.

Radiologists at the Necker Hospital now run a clinic devoted to contrast-enhanced ultrasound studies on two mornings every week. Around 50% of these referrals are typically for liver imaging. Most of the remaining examinations concern renal applications, which is an area that has grown markedly over the past few years.

“Renal applications represented only 19% of our contrast-enhanced ultrasound examinations a few years ago. Now they represent 50%,” he noted.

At the Necker Hospital, contrast-enhanced ultrasound is used most often in the kidneys to evaluate tumour perfusion prior to radiofrequency (RF) ablation. The results can help physicians choose what type of needle to use and the duration of RF treatment. The technique can also offer immediate feedback on tumour response. Any areas of persisting perfusion in the ablated area can then be re-treated.

The alternative is to use either CT or MRI, again with contrast. Contrast-enhanced CT may be contraindicated in many cases, though. Patients scheduled for ablation rather than surgery are more likely to be elderly or have chronic renal failure. The use of iodinated contrast could lead to nephrotoxicity in these patients.

Contrast-enhanced MRI is not necessarily the best option. Because the ablated area is a mixture of blood and tissue, the baseline signal intensity in the lesion will be quite high. It then becomes difficult to detect the characteristic enhancement of persisting tumour following contrast injection.

Correas acknowledges that ultrasound contrast is not the answer to all diagnostic dilemmas in the kidney. For example, it is not particularly helpful at distinguishing between solid benign and malignant lesions. The enhancement patterns are just too similar. The technique can, however, be used to detect and characterize cystic renal lesions.

One area where contrast-enhanced ultrasound could prove especially valuable is the assessment of renal perfusion in transplant patients. Rapid identification of cortical necrosis is critical in the days immediately after a kidney transplant. If the signs are spotted at a sufficiently early stage, then doctors have a fairer chance of halting the necrotic spread.

“If we could diagnose vascular disorders very early in these patients, then we could probably save some of these kidneys,” he said. “When they are treated too late, there is no chance of recovering renal function.”

Looking further into the future, ultrasound contrast is also being investigated for targeted, molecular imaging. This may surprise radiologists who are more familiar with CT and MRI, and who regard ultrasound as a more basic imaging technique, said Dr. Mathias Mäurer, a researcher in the neurology department at University Hospital Erlangen, Germany.

The gas-filled microbubbles used in ultrasound contrast must first be tagged with specific antibodies. Following injection, the microbubbles should then move towards their target and cluster around it. When ultrasound is applied, the bubbles are destroyed and emit a characteristic signal that can be detected. The position of the stationary bubbles can then be visualised.

Researchers at Erlangen are using this technique to investigate inflammatory processes at the blood-brain barrier. They have been specifically targeting a molecule known as ICAM-1 that is expressed during inflammation. However, because this is essentially a ‘platform technology’, the same approach could be taken for any endovascular target, he said.

The Erlangen team has also developed a means of quantifying the signal. This gives contrast-enhanced ultrasound a big advantage over its molecular imaging rivals. MRI offers good spatial resolution, but the signal cannot be quantified, according to Mäurer. Conversely, the radioactive signal can be quantified easily with PET, but the spatial resolution is limited.

With ultrasound, you have both,” he said. “You have good spatial resolution and also a good possibility of quantifying the signals. It may sound strange, but it is true.”

For now, the technique remains limited to laboratory studies. The linking molecule used to attach antibodies to the microbubbles is toxic to humans. Interest from an industrial partner is also needed to realise the method’s clinical potential, Mäurer said.

Acute renal failure after post-delivery haemorrhagic shock. A: Doppler ultrasound shows no alteration to the arterial blood flow. Resistive index is normal. B: Contrast-enhanced ultrasound is performed after IV bolus injection of 2.4 mL of SonoVue using real-time pulse subtraction imaging. Precontrast image (B) is very dark due to suppression of malignant signals. Postcontrast image (C) clearly demonstrates enhancement of the echoic area due to the presence of microbubbles not detected with colour Doppler ultrasound. The lesion was considered to be highly suspicious for malignancy. D: Pre- and postcontrast T1-weighted gradient echo MRI. The cystic lesion is slightly heterogeneous prior to contrast administration (top) and exhibits hyperintense signal due to the presence of haemoglobin residue. Postcontrast, there is no abnormal enhancement that would indicate the presence of solid perfused tissue. Contrast-enhanced CT also indicated the presence of a haemorrhagic cyst with no additional suspicious features. Pathology confirmed the presence of a cystic renal cell carcinoma, with a solid mural nodule of 6 mm. The diagnostic capability of contrast-enhanced ultrasound was superior to both CT and MRI in this case. (Provided by J-M. Correas)
News from the Society of Hungarian Radiologists

Compiled by Prof. András Palkó, Szeged/HU, and Prof. Berta Lombay, Miskolc/HU

Hungary has long-standing traditions in research of medical sciences, including radiology (as proven by more than a few Hungarian Nobel prize winners in this field), which might have been hampered by political drawbacks during the last century but never completely broken, and as a result of ongoing and improving investment in training and efforts to develop a proper technical background, it has been revitalised in recent years. We are proud to introduce some of the country’s most important research centres and briefly outline their activities.

Gábor Rudas

The MR Research Center, Szentágothai Knowledge Center, Semmelweis University is Hungary’s first designated multidisciplinary research faculty centered on MRI-based applied medical and basic research. The centre is founded by a consortium of Semmelweis University, the Faculty of Information Technology of the Peter Pázmány Catholic University, Gedeon Richter Ltd., and a group of well known Hungarian research institutes. The unique setting of the facility, being at the heart of the main clinical core of Semmelweis University, in the same building as the Departments of Neurology and Psychiatry, provides an excellent opportunity for clinical work, research, clinically-oriented basic research, and cognitive brain research. Current research topics include:

- Development and evaluation of a multi-modal diagnostic and follow-up regime for asphyxiated newborns, and their hypothermic therapy; using standard MRI and MRS methods and our own DTI-based temperature estimation method for the follow-up of cooling efficacy.
- Development and validation of a tactile pain stimulator system designed for the investigation of chronic pain syndromes and the efficacy of their treatment options.
- Development and evaluation of a combined fMRI and psychophysics technique for the simultaneous assessment of the behavioural and neuronal impact of diseases causing visual field deficits (optic neuritis, glaucoma, etc.) and their therapeutic outcomes.
- Development of a common framework for fMRI pre-surgical planning as a joint co-operation of Hungarian neurology and neurosurgery groups doing and/or using fMRI.
- A complex psychophysical, EEG and fMRI study on decision making on motion direction and on the effects of training on these kinds of decisions.
- A complex psychophysical, EEG and fMRI study on the inhibitory mechanisms of visual attentional selection.
- Psychophysical and fMRI investigation on the role of visual area hM5/V5 on real and illusory visual motion integration.
- Psychophysical and fMRI investigation of center-surround interactions of ambiguous surface movement.

Ervin Bereyti

Research and development activities that involve diagnostic imaging techniques are focused on Neuro-Oncology at the Medical and Health Science Center of Debrecen University. It is rather notable that the whole armamentarium of diagnostics are available, i.e., MR spectroscopy, spectroscopic imaging (fMRI, DTI). The latter two deserve special emphasis. In case of temporal lobe surgeries, speech and memory localisation (lateralisation) studies combined with neuropsychological tests have become part of the routine work-up, and further psychological paradigms are being developed. Research on DTI is aimed at clarification of preoperative imaging possibilities using a multiparametric analysis of tumoural anisotropy and neuropathological correlations. Novel utilisation of registered multimodal frameless 3D image information comprises support of daily, neurosurgical work (particu- larly rotatory gamma radiation technology) that involves use of multimodal (MR, PET, SPECT) data that had been collected earlier in frameless mode and now are being superimposed on recent CT images obtained by frame-localisation techniques.

Peter Bogner

At the Imaging Center of the University of Pécs, Department of Radiology, in the field of diagnostic radiology, the main research work is focused on dual energy imaging of different diseases with Siemens Definition dual source CT scanner. The other scientific working activity is focused on interventional radiology. A prominent subject in the department is the case of selective thrombolyis. In interventional onco-radiology, totally new protocols have been introduced for intra-arterial tumour therapy, also in rare localisation, which are administered for better long-term results or for otherwise hopeless situations and corresponding neoplasms. Experience has been gathered in combined oncotherapy of intra-arterial regional chemotherapy and radiation therapy for new indications as well. The opportunities to further increase the efficacy of radiofrequency ablation techniques in oncotherapy and non-oncologic conditions are being tested in vitro and in vivo. As the international research project in the field of US magnetic navigation (ESAOTE Mylab 90) in the invasive and interventional radiological procedures are running. The new Center of Neuroscience of Pécs University was founded in February 2007. The primary goal is to build and maintain a centre of knowledge working in the field of neuroscience, cognitive science and brain research. This interdisciplinary field requires the integration of knowledge of sci- entists and clinical professionals, as well as experts in neurology, psychiatry, psychology, biology, physics, mathematics and computer science.

In the background of numerous illnesses (obesity, psychiatric illnesses, epilepsy, chronic pain syndromes) lies pathological brain func- tion. Investigation of brain function by non-invasive technology became possible with revolutionary Magnetic Resonance methods. The 3T Magnetom Trio MR scanner installed in our Institute in September 2007 provides the essential infrastructure to our research activities.

András Palkó

The Department of Radiology of the University Medical School of Szeged runs several research programmes in various fields. One of the most promising is the evaluation of the endovascular treatment of carotid artery ste- nosis from a technical-biomechanical point of view, aimed at developing more effective, longer-lasting and less vulnerable stent solu- tions for this purpose. Another interesting field of research in Szeged is the evaluation of different endoluminal contrast media for the MR examination of the gastrointestinal tract, which has already resulted in a well established examination protocol in which the application of different contrast media is harmonised with appropriately designed MR sequences. But further research is necessary for the standardisation of these solutions. As a result of a very fruitful cooperation between the Szeged department and indus- trial partners, development of new software allowing for automatic segmentation of the liver and its components has been completed, in association with an interactive tool further improving the flexibility of this technique. This ongoing project will be extended to the development of similar solutions for certain vessels and brain structures.

Another collaboration, between the Szeged department and an other research center possessing a 3T magnet, makes it possible to start up programmes for the evaluation of diffusion-weighted and spectroscopic MR imaging of pre- and post-treatment liver, prostate and lung malignancies, lymph nodes and bone metastases and the potential ben- efits of whole body MR imaging compared to PET- and SPECT-CT.

Last but not least another promising project in progress (run in parallel by the radiolo- gists and cardiologists of the Szeged Uni- versity) is the evaluation of myocardium viability by computer-assisted analysis of the myocardium blush during coronary artery catheterisation, in comparison with results of cardiac-CT and -MR examination.

The European Forum for MR research and clinical practice’s 2008 ESMRMB conference will be held in Valencia, March 10-12, 2008.
Radiology as a discipline needs great teachers with excellent reputations

By Mélisande Rouger

Medical students have long been ignored by the radiological community. Amid fears of staff shortages and take-overs by other specialties, teaching future doctors is a formidable opportunity for radiology to affirm its role and recruit more candidates, say three experts in the session "Undergraduate radiological education", presented on Tuesday. "The focus on undergraduate education is very recent. Most congresses concentrate on the education of radiologists or doctors because radiology is a fast-evolving field with many new techniques to learn," says Prof. Koen Verstraete from Ghent University Hospital, Belgium. "The community is just beginning to realise that teaching undergraduates is important, and the sooner you do it, the better."

De facto, radiology is under-represented in the European medical curriculum. In the new EU scheme, medical studies are organised around teaching blocks. Each lasts about 8 weeks and focuses on an organ system, involving various specialists who are chosen by the educational board at the beginning of each term. So far, radiologists haven't involved themselves enough in the decision making, and their field has been attributed little importance by them. With one or two per term, radiology can only expect to feature in two or three questions out of 100 per exam, a skeletal proportion that students often consider negligible or not worth studying. "Teaching radiology is a challenge, because historically it is not so important in the medical curriculum," admits Dr. Mario Maas, from Academic Medical Centre, University of Amsterdam, the Netherlands.

To secure enough candidates, radiology needs to increase its visibility at medical school. But it must also become more attractive to students, who "are not so interested in dedicated MR sequences or in how many slices can be gained in how many subseconds of a CT investigation," jokes Kainberger. Instead, radiology teachers should focus on the proper indications for imaging by using published referral criteria, training students to phrase a referral diagnosis, and developing new concepts to teach this properly. "Physics is more than just lecturing about electrons that fly with enormous speed in an x-ray tube from the cathode to the anode," he adds. Aspects of biomedical imaging and a new understanding of radiation protection also have to be integrated with the teaching.

Fears aside, diagnostic imaging's input to the medical curriculum is crucial, notably in anatomy classes, where it supports dissection. "Current evidence suggests that imaging and cadaveric dissection may be complementary rather than competitive tools for learning anatomy," wrote Kenneth A. Miles, Chair of Imaging at Brighton and Sussex Medical School, UK (in: Diagnostic imaging in undergraduate medical education: an expanding role). "The availability of images in the dissection room has been shown to enhance the independence and proficiency of students and improve the efficiency of their dissection time... it is also associated with high levels of long-term knowledge retention and generates high levels of student interest in gross anatomy," he observed.

Modern tools can help radiology gain importance in undergraduate teaching. E-learning offers a basis to support teachers as well as students. "95% of students work from home. Thanks to e-learning, they achieve better scores at exams because they can prepare for them better," says Maas. Computer-assisted exams should increase the proportion of radiological questions, as well as the quality of the test. "To have images where the student can click on anatomical parts, diseases or fractures would improve the quality of tests, which were formerly based on printed images," says Verstraete. He uses two home made computer systems, TELEDAR (Teaching, Learning, Radiology) and EDURAD (EDUcation in Radiology), but similar tools, such as Blackboard, are already available at many medical schools. This system also makes corrections a lot faster, which is crucial for radiology teachers, whose time is limited. "Teaching is mainly done by heads of departments, but these people are often so busy managing their team or carrying out examinations that teaching is the very last thing on their minds," he says. Ideally, 1 or 2 radiologists per department should dedicate 30 to 50% of their time to teaching. Kainberger goes further: "Residents and young radiologists should become competent in teaching by receiving systematic training. Radiology as a discipline needs great teachers with excellent reputations."

According to Maas, radiology needs nothing less than mentors. His forewarning lecture, 'Mentoring the enthusiastic student', explains how to create 'synergetic sessions' between the teacher and his class. "My aim is to get as close to students as possible. When I work in small groups of 12 students, teaching is much more personalised", he says. "I follow them, and they might stay in touch with me afterwards. In a way, it's like having children."

CT dataset on which you see a radiating shrinking of the pleural surface adjacent to the tumour (A) and the interstitial lymphatic spread of the tumour (B). (Provided by Prof. Franz Kainberger)

With 125 hours spread over 6 years, radiology represents 3% of the curriculum at Vienna Medical University, Austria. "As known in the literature, 80–100 hours are fairly common for North American and European medical schools to teach diagnostic imaging," says Prof. Franz Kainberger, Chairman of the session. "The proportion of students choosing radiology as a specialty after they graduate is also low. In Austria, out of 1,100 students who graduate each year, 4 to 6% choose to do their residency in radiology. In Belgium, for 100 annually graduating medical students, nearly half decide to specialise, only 7% of which opt for radiology.

In the light of new medical needs on the old continent, these are disturbing figures. The number of radiological examinations increases each year by 5% EU-wide thanks to better technologies, but also because people are getting older. "Fears concerning a shortage of radiologists do exist; it is already a problem in many countries such as the UK and France," notes Verstraete. The recurrent fear of losing ground to other specialties also worries experts. "So-called turf battles among medical disciplines are moving from postgraduate to undergraduate education," observes Kainberger. "We should involve ourselves in the discussion to answer questions such as who should teach breast carcinoma – the gynaecologist, the general surgeon, the oncologist, the radiologist?" he urges.

Panel discussion: What is the radiologist's role in a problem-based integrated curriculum?
Swiss President to lead next year’s ‘summit of science’

By Monika Hierath

As this year’s ECR is coming to an end and the preparations for the congress of 2009 are already beginning, we would like to introduce to our readers the incoming ECR President, Prof. Borut Marincek, who will preside over ECR in 2009, is Full Professor of Radiology and Chairman at the Institute of Diagnostic Radiology at the Zurich University Hospital in Switzerland. His interest in radiology, in particular in computed tomography and magnetic resonance imaging, is reflected in over 270 authored and co-authored scientific papers, 47 book chapters and over 180 lectures, orations and invited lectures in Europe and overseas.

ECRT: What are your favourites at ECR 2008?

BM: One of my favourites is certainly cardiovascular imaging, which underwent a significant change during the past few years. The number of abstract submissions in this field has increased enormously, by 50% compared to 2005, and even quadrupled in comparison to 2004. This fact demonstrates that cardiovascular imaging is an important topic at ECR. Another field of interest is abdominal imaging, bringing my special subject from the beginning of my professional career in radiology: I am acting president of the European Society of Gastrointestinal and Abdominal Radiology (ESGAR) and therefore this area is of great importance to me.

ECRT: What are your ambitions and expectations for your term as President of ECR?

BM: My ambitions are to achieve an extraordinary satisfaction among the participants, which will be shown by means of ratings and evaluations of the sessions. Furthermore, it is important that the speakers get good feedback and are appreciated by the participants.

ECRT: What will be the main focus of ECR 2009, and what will be the scientific highlights regarding new technology presented?

BM: An important focus will be on cell imaging and image-guided therapeutic interventions. There will be many highlights within the New Horizons Sessions, State-of-the-Art Symposia, Presentations and Workshops, orations and invited lectures in Europe and overseas.

ECRT: Challenges Session on the topic of radiation protection.

BM: The partner discipline of the next congress will be emergency medicine, with the European Society for Emergency Medicine as a partner. Emergency medicine is an important interface in the daily work of radiologists.

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

BM: Most certainly it will be a theme with a Swiss flavour, but I do not want to tell you more about it right now; after all it should be a bit of a surprise!

ECRT: In addition to your numerous commitments you serve on the steering committee of ESOR. The aim of ESOR is to extend teaching resources worldwide and to raise standards in the field of scientific radiology through global e-learning initiatives. Has Europe already attained an equal level of educational standards in radiology?

BM: ESOR has published a revised charter for training in clinical radiology, which had been elaborated by the former EAR and UEMS. Furthermore, a survey was carried out about radiological training in Europe.

This survey demonstrates the existence of a wide spectrum of diversity in terms of requirements, training schemes, appraisal and professional evaluation between the various countries across Europe. The training curriculum is more or less similar to the recommendations given in the EAR/UEMS Training Charter in only 13 countries. In addition, there are significant differences between the countries regarding the number of radiologists per million inhabitants. Subspecialties in radiology are officially recognised in less than 50% of the countries, and subspecialty training starts at a variable level of the training programme.

We learned from this survey that in Europe there are still many differences – there is still a lot to do to achieve standard guidelines. ESOR is an ideal instrument to compensate for this deficiency in training where it is required, and ESOR therefore is an important structure within the ESR.

ECRT: What is your message to the younger generation of radiologists at the beginning of their careers?

BM: If you want to find satisfaction in your profession and achieve outstanding results in science, it is always important to be a fun of radiology, love your job, get your daily high-light of new knowledge and get your daily satisfac-tion of human and interpersonal relation with your colleagues and your patients.

ECRT: The University of Zurich celebrates its 175th anniversary in 2008, themed ‘sharing knowledge’. ESR has also started to raise pub-lic awareness about medical imaging, this year with a public campaign on women’s health – a strategy worth being continued?

BM: I think that public health campaigning is an extraordinarily important assignment of ESR. In my opinion there are far more appro-priate topics than women’s health, where the health of men would not be disregarded; as for example the focus on youth to prevent and fight obesity or imaging adapted to the needs of elderly patients.

ECRT: How and when did you decide to become a radiologist?

BM: I knew very early that I wanted to become a radiologist, at that time I was still in medical school. I was always fascinated by the pos-sibilities to correlate imaging, morphology and function as well as to map non-invasively anatomy and disease processes.

Looking back, to choose this profession was the best decision I could have made in my life. I find radiology still highly absorbing, because it plays a central role in the healthcare system and is one of the fastest growing areas in med-i-cine, both regarding the clinical settings and the R&D.

This fascination with exciting advances in functional and molecular imaging, progress in biotechnology, nanomedicine and new innovative therapies fills me every day with new enthusiasm. I believe that it is essential to acknowledge the importance of the multidis-ci-plinary character of research and collaborate with other disciplines.

ECRT: What are your favourite remedies against stress and burnout?

BM: In my spare time I love to go mountain biking in the woods; I enjoy nature very much and I find it a very pleasant way to relax the mind and at the same time to get some exer-cise. Another favourite sport of mine is rowing; it is a good way to get in touch with the elements of nature and a nice opportunity to spend time with friends. To cultivate friend-ship and social contacts is important to be able to exchange thoughts, to learn from history, and to get new ideas. I am quoting Sir Win-ston Churchill: “The further backward you look, the further forward you can see”. This is one of my personal guiding themes when try-ing to approach contemporary issues in our globalised world.

Prof. Borut Marincek, ECR 2009 Congress President.
ERS meets General Practitioners Part 4

Radiology is a new and challenging area for European GPs

By Mélisande Rouger

Prof. Christiane K. Kuhl has been an associate professor of Social and Family Medicine at the University of Crete, Iraklion, Greece, since 1994. On Saturday he presented the lecture 'Assessment of coronary artery disease (CAD)' from a general practitioner's point of view.

"Assessment of the risk of coronary artery disease development plays a pivotal role in the prevention and early treatment of this disease," said Prof. Lionis. To stress his purpose, he reviewed the different approaches to evaluating the risk of CAD, a major cause of premature death in developed countries. First, he focused on the clinical individual-based approaches, both traditional – based on clinical recognition of risk factors, use of diagnostic tests and conventional care – and modern – based on the recognition of the multifactorial nature of this disease and use of the SCORE Model and Risk Charts in assessing the risk for development of cardiovascular disease (CVD). Then, he depicted the epidemiological approach at the GP's office, using pre-test and posterior probabilities based on estimations given by the office electronic patient records system. Finally, he introduced the population-based approach that uses medical records or community-oriented prevention programmes to assess the population risk using different multifactorial risk models.

"Diagnostic probabilities of symptoms and signs that indicate CAD, which are recognised at the GP's office are also an important item of discussion," added Lionis.

Guidelines were presented for all GPs and physicians practicing in primary care, as well as procedural skills and diagnostic algorithms for evaluating suspected CAD patients.

"In general practice, we frequently experience challenging issues such as CAD, particularly working together with other clinical disciplines and specialties," commented Lionis, who chose his profession because of the large range of clinical services it covers. If radiology is a valuable tool in assessing and diagnosing CAD, the use of ultrasound imaging in liver and gallbladder diseases is also "an area of high interest and demand for further training of GPs," he said.

"Radiology is a growing discipline that challenges GPs to adopt new and inexpensive diagnostic modalities and to implement them appropriately in primary healthcare ... it is a new and challenging area for the European General Practice / Family Medicine," he added.

Unsurprisingly, 'ERS meets GPs' was well accepted among GPs. "It generated enthusiastic acceptance at the executive board of the European Society of General Practice / Family Medicine Executive Board (WONCA Europe)," he recalled.

According to Lionis, physicians should increase their cooperation in many areas, including research and continuous medical professional development. "Such cooperation also has a major impact on the improvement in the quality of care and patient's health," he insisted.

Radiologists are the general practitioners of contemporary clinical medicine

Prof. Christiane K. Kuhl from Bonn, Germany, will present the Peter E. Peters Honorary Lecture entitled 'New paradigms in breast imaging' on Monday.

By Mélisande Rouger

Professor Christiane K. Kuhl, Vice-Chairman of the radiological department and director of the division of oncological imaging and interventional therapy of Bonn University, is a pioneer in MRI breast screening who perfectly embodies the multidisciplinary quality of radiology.

Born in 1966 in Bonn, she obtained a medical degree from Bonn University in 1991. After excelling in her radiology studies – she received her doctoral thesis with summa cum laude – she undertook a residency in neurosurgery in 1996–1997, which she completed with a fellowship in neuroradiology in 2002. She has been Professor of Radiology at Bonn University since 2004.

A board-certified neuroradiologist, her main fields of interest are breast imaging, onco- logical imaging and interventional oncology (minimally-invasive therapy of cancers and metastases), as well as high-field MR imag- ing. Kuhl's work on early and non-invasive diagnosis of breast cancer has been frequently saluted by her peers. She was notably the first woman to receive the European Magnetic Resonance Award in 2006. She also received significant distinctions such as the American College of Radiology Imaging Network Award for 'Outstanding Contributions', Honorary Membership of the Royal College of Radiolo- gists Breast Group (UK) and the 'Hofhusen- Ring', the German Radiological Society's highest award for scientific achievements.

Standing at the crossroads of radiology and oncology, her contribution to the medical sphere has also been recognised by the latter. During the recent American Society of Clini- cal Oncology (ASCO) congress, the paper she and her colleagues presented was selected as 'Best of ASCO', for their discovery that, to detect pre-invasive breast cancer, the addition of high-resolution MRI offers a significantly higher sensitivity compared with state-of-the-art mammography.

"Breast radiologists are true doctors for their patients, passionate clinicians and enthusiast- ic clinical researchers, because their research efforts are driven by clinical need – and that is: to improve our ability to find cancer at the earliest possible stage, and help guide treat- ment. Breast radiologists are equal partners in a truly multi-disciplinary team," Kuhl says.

Her lecture at ECR focuses on the increasing importance of non-mammographic imaging techniques for breast cancer screening, the importance of diagnostic imaging for person- alised (or individualised) treatment strategies and the ever-increasing need to better inte- grate functional breast imaging with drug dis- covery and delivery.

Her outstanding contributions to basic and applied research in medical magnetic reso- nance, particularly in breast imaging, have opened the doors of prestigious societies: the Radiological Society of North America, the International Society of Magnetic Resonance in Medicine, and the American Society of Clinical Oncology. She is also a member of the "Working Group on Breast MRI" at the National Cancer Institute, Bethesda, Mary- land, US, and of the Breast Section of Ameri- can College of Radiology Imaging Network.

In addition to 23 review articles, about 240 citable scientific abstracts and 7 book chap- ters, she authored 76 original articles. She is associate editor and consultant to the editor of Radiology, as well as a member of the scientific editorial board of RöFo (Journal of the German Radiological Society), and a peer reviewer for Journal of Magnetic Resonance, Journal of Clin- ical Oncology European Journal of Cancer, and Nature Medicine, among others.

For Kuhl, radiology "is fun". "Diagnosing dis- eases is important and fascinating. Radiology, in particular, has such a broad scope – radi- ologists are the actual ‘general practitioners’ of contemporary clinical medicine.”
ESR welcomes India as guest country and exchanges knowledge in the diagnosis of tuberculosis

By Milindashe Rouger

Prof. Nadhamuni Kulasekaran is President of the Indian Radiological and Imaging Associations (IRIA). In an interview with ECR Today, he talks of the shortage of Indian radiologists, their struggle for excellence and how their knowledge of tropical diseases may benefit European radiologists.

ECRT: How do you see the demography evolving within 20 years?

NK: Around 10,000 radiologists are working in India. IRIA has more than registered member radiologists, with an equal number of radiologists working abroad. In the next 20 years there will be a fresh population of young radiologists, with men and women doctors in equal numbers, excelling in all modern modalities. There may even be more women than men in active radiological practice.

India has adopted a non-progression population strategy, promoting one child per family. The population will not increase; rather it might decrease.

But already there are not enough radiologists in India. We need a manifold increase in the number of radiologists to fulfill requirements.

ECRT: How is Indian radiology meeting the growing need for a multidisciplinary approach in radiology?

NK: By conducting interdepartmental meetings in neuroradiology, uroradiology, pediatric radiology, orthoradiology, etc., exchange of knowledge is promoted. Case discussions are conducted and appropriate treatment for a particular patient is decided.

ECRT: How would you judge the importance of exchanging knowledge between Indian radiologists and the rest of the world?

NK: Exchange of knowledge between Indian radiologists and radiologists abroad is an intrinsic necessity for the advancement of knowledge and technology. Epidemiology of diseases varies greatly from one region to another, hence exchange of ideas is essential.

India is a densely populated and fast developing country, and tropical diseases like tuberculosis (TB) abound in their varied manifestations, which all Indian radiologists come across in their practice. Our radiologists can contribute more information to the rest of the world about such diseases.

ECRT: The availability of skilled staff is a prerequisite for implementation and maintenance of high quality radiological services. What do you do to ensure adequate education and training in modern imaging methodologies?

NK: Continuous medical education programmes and updates are conducted for the students, as well as practicing radiologists and technicians, to keep pace with modern developments. Hands-on training is given with the latest equipment.

ECRT: Why did you choose to focus your lectures for the ‘ESR meets’ programme on tuberculosis? And, at a time when TB is making a comeback in Europe, especially in the UK, do you think Indian radiologists’ knowledge and technology will be of interest?

NK: TB has been endemic in India for a long time. With the increased incidence of HIV and re-emergence of tuberculosis in the West, the knowledge of Indian radiologists will definitely help their western counterparts. Their vast experience in diagnosing this disease, which has varied presentations in every organ of the body, can be shared with others, so that united we can fight TB.

ECRT: What do you consider the main difference in university life in India? Europe? The US?

NK: Indian universities provide training in radiology in the form of two courses: the Postgraduate Diploma in Medical Radiodiagnosis (DMRD) and the Postgraduate Degree in Radiodiagnosis (MDRD). The residents are trained in all fields of radiology during the course period. The subspecialty training can be done after the master’s degree and residents will get hands-on training during the residency programme.

In Europe and the US, the university funds the postgraduates to pursue their studies and undertake various projects to excel in their chosen studies and fields, whereas in India, the financial support for students is very much limited. Indian postgraduates are still trying to excel on a par with their Western counterparts.

ECRT: For ECR 2008, Indian radiologists submitted 104 scientific abstracts, which represents a 181% rise in comparison with last year. Has India’s participation in the ‘ESR meets’ programme motivated Indian radiologists to become more involved in ECR 2008?

NK: Yes, definitely. Furthermore, in addition to the current presentations and participation, if ESR came forward to encourage the postgraduates with free registration and subsidised accommodation, it would increase participation even more.

ECRT: Is there competition between radiological services and other services in India?

NK: Radiology has grown beyond its diagnostic role to include invasive and therapeutic procedures, and this has led to competition between radiologists and other specialties. For example, vascular services have become a hotbed for specialist overlap between cardiac surgeons, vascular surgeons and interventional radiologists. Specialist clinicians believe they are capable of interpreting the images in their fields.

ECRT: What future trends and challenges do you foresee in radiology?

NK: 1. The inadequate size of the workforce is a challenge which we have to meet.

2. The future will bring functional and molecular imaging and continued expansion of electronic imaging, computer applications and interventional radiology. Corresponding expansion of our curriculum will therefore be essential.

3. Increasing the research enterprise.

4. Managing the information network.

5. Participating in the globalisation of medicine.

ECRT: What was your main motivation in choosing your profession?

NK: Basically, my interest in diagnostic radiology and imaging, with special interest in procedures and technology, was my main motivation for choosing this profession.

To avoid these problems, radiologists must maintain their expertise at a level above that of other clinicians, both in imaging and clinical knowledge, as well as maintain good relationships with management and referring clinicians.

The Radiological Society of Bosnia and Herzegovina

The main issues for the Radiological Society of Bosnia and Herzegovina, in this and the following years, are to develop their research field. So far, members of the society have been involved in many research activities and the goal is to improve this field of work. The particular aim of the society is to emphasise the role of young physicians devoted to scientific work and implementation of new technologies and methods in diagnostic imaging and interventional procedures.

The society has high expectations from the field of interventional radiology. It is hoped that it will become an important part of the society’s work and development.

In recent years, radiological institutions in Bosnia and Herzegovina made considerable investments by purchasing new equipment, such as the high-field MR, multi-detector CT, and 3D and 4D colour Doppler ultrasound machines.

Investment in human resources, as well as radiological equipment, will ensure that Bosnian radiology will follow current radiological trends and be part of them.

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Brave new world of image-guided surgery necessitates different strategies and mindset

By Karen Sandrick

Volumetric databases are spurring the development of advanced visualisation tools that will create anatomical ‘augmented reality environments’ so surgeons can overcome the limited laparoscopic field of view and see precisely how they are moving their instruments within the larger anatomical context.

This paradigm shift will require radiologists to expand their own field of view about the relationship between imaging and interventions. Additionally, it will challenge radiology training programmes to move beyond conventional imaging techniques and procedures of today that often give short shrift to research or only occasional exposure to patient management.

“We are no longer restricted to a series of cross-sectional images, and even 3-D reconstructions can be seen as simplistic ways to display the huge wealth of data that we are able to acquire with up-to-date imaging equipment,” said Prof. Carlo Bartolozzi from the Institute of Radiology at the University of Pisa, Italy, who will chair the special focus session on ‘The radiologist in image-guided surgery: just a tour guide?’

“Advanced visualisation tools can be envisioned that will take surgeons into an environment where the anatomy and the pathology of the patient is represented and can be appreciated not only with static views but with dynamic navigation within the data set and possibly with other types of information, such as tactile feedback,” he noted.

While these tools have yet to approach the virtual reality of science fiction movies, they are increasingly being used in neurosurgery and vascular surgery. In the works are techniques for abdominal surgery that will enhance the surgeon’s orientation within the patient’s body and add a panoramic overview to the keyhole environment where the anatomy and the pathology of the patient is represented and can be appreciated.

Critical for the refinement of these visualisation tools is the integration of imaging and interventional radiology with surgery and other disciplines in both training and research, said Prof. Hedvig Hricak, Memorial Sloan-Kettering Cancer Center, New York, who will answer the question ‘Intraoperative imaging: who carries it out?’ at Monday’s session.

“Advanced visualisation tools can be envisioned that will take surgeons into an environment where the anatomy and the pathology of the patient is represented and can be appreciated not only with static views but with dynamic navigation within the data set and possibly with other types of information, such as tactile feedback.”

While research is sometimes looked upon as merely an academic exercise, it is crucial for the advancement of clinical care, and participation in research builds the physician’s understanding and acceptance of innovations, she added.

Radiologists need to prepare for image-guided surgery by devoting more time in ‘packaging’ imaging data, Bartolozzi said. They should not be satisfied with the acquisition of high-quality images and prompt and accurate interpretation. They need to present imaging data in a way that is meaningful for the surgeon and that is targeted at addressing specific surgical issues.

“As of today, the radiologist has been accustomed to processing the huge amount of multimodality information and providing it to the user as a ‘message in the bottle.’ The common idea is that our job is finished when the post-processing and reporting phases have been carried out. This is no longer the case, because a continuum exists between image production and its utilisation in guiding therapy,” he said.

“The radiologist is no longer a ‘message in the bottle. The common idea is that our job is finished when the post-processing and reporting phases have been carried out. This is no longer the case, because a continuum exists between image production and its utilisation in guiding therapy,” he said.

In the near future, radiologists should be more prepared to leave their traditional ground (we are used to playing at home!) and meet the new challenges of a shared field where radiologists and surgeons will try to play the tough game of image-therapy integration.”
Where does imaging of the head and neck go from here? It is hard to imagine further anatomic advances, although the continued improvement of dedicated head and neck surface coils, higher field strength, and more selective contrast agents may indeed assist us in the future to detect lesions at an earlier point in time. In particular, ultra-small iron oxide particles (USPIOs) will help in the differentiation between benign and malignant lymph nodes.

No doubt, the advances made in MR imaging and spectroscopy, and PET will improve our ability to detect recurrent cancer earlier. Advanced 3D workstations and new imaging systems combining CT and PET or CT and SPECT are a reality today. The integration of some metabolic imaging devices such as PET into the MR scanners, in which both high-resolution anatomic images as well as metabolic profiles of this anatomy are rendered, has just started.

The integration of imaging technology into the therapeutic arena is also a reality today and will only improve with time. Neuronavigation using preoperative imaging has improved the surgeon’s ability to find and resect smaller lesions in the head and neck area. The same technology is applied to sinonasal and skull base surgery. Intraoperative imaging with MR imaging, CT, and sonography will increase. Through the use of image guidance systems, we will see further integration of imaging technology, not only in the operating room but also in the radiation therapy department.

The fusion of CT and MR imaging and the integration of these into the treatment-planning environment will surely improve the precision of radiation therapy treatment, which is long overdue. We are now entering an era when these advanced technologies will be combined in a cohesive way to treat a patient. No longer will it be acceptable to have many different examinations performed on a patient without the integration of this information into a data set that is easily manipulated by the treating physician, the radiation oncologist, or the head and neck radiologist.

The molecular biological profile of patients may be used in the future to stratify individuals into risk categories. Imaging may then be used in a screening mode for those at high risk of disease, provided that early detection is accompanied by treatment options.

These advances will certainly keep us in business over the next 5 to 10 years. After that, who knows? In the field of head and neck imaging, higher resolution imaging, metabolic information, and the leverage that faster and more powerful computing will bring certainly will make for a bright future for our field.

To certify people who are especially interested in the field of head and neck radiology the ESHNR is offering a diploma of head and neck radiology, which candidates can apply for after a well-defined training cycle.

The purpose of the Society is:

- to advance knowledge in the field of head and neck diagnostic radiology, interventional radiology and diagnostic imaging
- to stimulate interest in the field of head and neck radiology
- to promote research in head and neck radiology
- to improve methods of teaching radiologic diagnosis of diseases in the head and neck area
- to provide meetings for the presentation of papers and the dissemination of knowledge
- to improve dental and maxillofacial radiology

The next annual meeting of the European Society of Head and Neck Radiology will be in Geneva, Switzerland from November 6–8, 2008. For further information visit the congress website http://www.eshnr2008.org

www.eshnr.org
Proactive approach can improve patient management in emergency imaging

By Frances Rylands-Monk

Closer and longer inspection of images will ultimately save lives, but this is only possible if rigorous procedures and systems are in place, according to Prof. Danielle Balériaux, head of neuroradiology at Erasme Hospital, Brussels. Even good radiologists will not always make the right diagnosis if they are overstretched, she warned.

“In the early days of CT, it took one hour to create 12 images. Now we can create 130 images in 20 seconds, so within a minute the next patient’s images are generated. Because we can’t change patient numbers, we need more trained radiologists to look at them, plus continuous education,” Balériaux said.

In an average day, she sees 15,000 images in 10–12 hours, not taking into account colleagues who ask for her comments on other images.

“The number of radiologists in Belgium is fixed, and we are now short of them,” she stated. “Salaries need to be paid so that a doctor can study one important image for 15 minutes instead of two minutes, otherwise they’ll miss data due to the factory line of image production.”

From the outset, the role of the radiologist is key to diagnosis, treatment, and outcome. Missing a haemorrhage, hidden tumour, or abscess can prove life-threatening; for instance, subarachnoid haemorrhage due to bleeding from an aneurysm can be overlooked in a first scan because sometimes the aneurysm does not bleed profusely.

“They are the anaesthetists of potential multi-ple problems, not just the problem which the referring doctor thinks it might be,” Balériaux said. “To avoid mistakes, we should learn why the patient has come to us by talking to the patient or carer when possible and finding out what the symptoms are. Don’t leave the examinations to the technologist and then report from an ivory tower.”

During Monday’s special focus session, Prof. Klaus Bohndorf, chairman of radiology at Klinikum Augsburg, Germany, will discuss the systematic nature of mistakes. He also notes that the vast majority of errors are due to radiologists not having direct contact with patients and relying on insufficient histories provided by clinicians. Like Balériaux, he thinks problems arise when doctors jump to conclusions or they uncritically accept previous diagnoses and fail to use all imaging methods for a diagnosis.

“One patient should have one radiologist to gather all imaging data, compare scans, and draw a conclusion. Radiologists must ask for and look at previous images,” Bohndorf said. He also suggests that radiologists take a proactive role in the management of patients and not just accept the clinicians’ proposals.

“If an elderly lady falls and suffers pain in the hip, an x-ray requested by the clinician may reveal no signs of fracture. As radiolo-gists, we should say that fractures are often overlooked on an x-ray, so we propose fur-ther investigation by MRI if pain persists,” Bohndorf said.

Taking the next step to address problems should be done in writing. This will make sure that the referring clinician knows that the dis-crepancy between x-ray findings and patient history is not satisfactory, he added.

At Bohndorf’s institution, emergency cases involving heavy trauma, e.g. from car acci-dents, are read again on the next morning.

“Because 10–15% of pathological findings may be missed at night, we advocate that trauma cases undergo a second reading the following day. With clearer minds, and less stress, more diagnoses are made,” he said.

Double-reporting should not only involve a second reading but also a second pair of eyes, according to consultant radiologist Dr. Alan Hugh Freeman, Addenbrooke’s Hospital, Cambridge, UK. He thinks that double-reporting has double logic for emergency CT.

“In the UK, double reporting is paradig-inally used routinely in 80% of mammaogra-phy screening centres, in which women being screened are, by definition, healthy. Con-versely in an emergency CT for acute abdo-minal-tumour, results are usually read by one person,” he said.

Freeman cites the need for processes in two categories: to avoid ‘pitfall error’ (i.e., mistakes by radiologists) and generic, ground control error (i.e., infrastructure error that applies to all subspecialties).

“There is an increasing awareness among the lay public about medical errors in general, and particularly about radiological errors. To avoid catastrophes, people now quite rightly expect the same process scrutiny made by the aerospace industry to be applied to medical processes. Gone are the days when human error was simply accepted,” he said.

Mistakes or discrepancies should be reviewed in a systematic quarterly meeting with the clinical director, he suggests. In his talk on Monday, Freeman will be addressing the three common modalities used in abdominal imag-ing; plain films, CT examinations, and ultra-sound. First, misinterpretation or lack of per-ception in plain film will be looked at using examples where mistakes have led to death.

In one such case, a 22-year-old man with a previous abdominal operation due to a road traffic accident was admitted to hospital two years later with pain. A ‘normal’ x-ray resulted in him discharging himself, whereupon he developed ischaemic bowel, which ruptured at home. In this case, clinicians failed to flag the previous surgery in the accompanying history. Also, radiologists failed to notice the visible abnormality of a gangrenous bowel in the x-ray.

This mistake took place in the late 1990s, when the reporting of film was still commonly delayed for three days, and this contributed to the error. However, an ‘abnormal’ x-ray with a ‘higher risk’ clinical history should have been treated seriously, he noted.

“Ultrasound is not easy, and even basic tests can result in major discrepancies. Therefore, whoever uses it, whether radiologist or emer-gency doctor, needs appropriate formal train-ing and expertise,” he concluded.

CT problems encountered with intravenous contrast agents and bleed. A. The significance of the high attenuation material posterior to the stomach (arrows) was obscured because of adjacent contrast material and in fact was due to fresh bleeding into the lesser sac. B. This post-contrast scan suggests a patent portal vein (arrow), whereas the vein was full of high attenuation thrombus. (Provided by A. Freeman)
Cultural rendezvous

A true gem of a museum with unexpected delights

By Julia Patuzzi

An attractive and rewarding stop during your sight-seeing tour through Vienna is the Old Vienna Schnapsmuseum. A visit to this museum not only gives insight into the tradition of distilling, but it also conveys the atmosphere of an old Viennese bourgeois family. The whole interior, from the office furniture to the machinery and some interesting devices, is original 1870s to 1920s and still in use, thus providing a truly unique ambience.

This old Viennese company was established in 1875 and is still considered a specialist in the making of brandies and liqueurs, the quality of which is determined by ancient recipes. The factory has been running under the leadership of five generations of the Fischer family, who gladly introduce visitors to the traditions of the distillery craft. As soon as one enters the ‘comptoir’, its original panelling and office equipment from the early 1900s (including the cash register, which has been continuously in use since then), one feels transported to the ‘good old times’ of the Austro-Hungarian monarchy. An enlargement of a picture taken in 1920, copies of old bills and numerous medals conferred for excellence emphasise the originality of this office.

After a short ceremonious greeting by the owners, guests are conducted to the ‘composition room’ where there are wooden and ceramic vessels containing products manufactured in a natural way. Carafes with different herbs, nuts, roots, and even pieces of wood fill the shelves. After a stop-to-sniff pause in this mysterious world of liqueur production, the visitor is led into the heart of the factory – the distillation room!

In this large production room, the guest’s eyes are caught above all by the distillation equipment, weighing 2 tons. The steam-driven boiler is the heart of the factory. The visitor is led into the heart of the factory – the distillation room!

The distillation room with its steam-driven boiler is the heart of the factory.

Continuing the tour, visitors are shown the fascinating exhibition of further equipment, among them a distillation chamber designed by Louis Bochmann in the 19th century, and enlarged original pictures of the old factory and its fleet of wagons, complete this ‘spiritual’ journey into the past.

To make some delicious memories back home, don’t miss the chance to buy some samples of the ambrosial, tempting liqueurs and brandies.

What’s on today

CLASSICAL MUSIC

Opernhaus
March 10 19:30 Le Bohème by Giacomo Puccini, conducted by Jun Märkl, with Philip Web, Bobbi Daniel, Tamar Iveri, Šimka Ivan
March 11 19:30 Ballet Gala conducted by Alexander Vedou, choreographed by Marius Petipa, Janna Elo, Andris Lukacs

Theater an der Wien
March 11 19:00 Miedzy by Luigi Cherubini, conducted by Fabio Luisi with Iano Tamar, Olaf Bar, Hennett Borde-Hansen

Volkstheater
March 11 19:30 Der Evangelimann by Wilhelm Kienzl

Wiener Kammeroper
March 11 19:30 Blood Eskibit by Judith Weir, conducted by Daniel Heyem Cavauz

THEATRE

Aukademietheater
March 10 19:30 Die Ziege oder Wer ist Sylvia by Edward Albee
March 11 20:00 Sturm by William Shakespeare

Theater in der Josefstadt
March 10 19:30 Geyerlaff by Johann Nestroy
March 11 19:30 Der jungste Tag by Ödön von Horvath

Vienna’s English Theatre
March 10/11 19:30 Donkey’s Years by Michael Frayn

Konzertsaal
March 10 20:00 Miriel Sugawara Trio
March 11 20:00 Jazz Pastor

Porgy & Bess
March 10 20:00 Myra Melford & Marty Ehrich
March 11 20:00 MAALO

Buchtei

Yeast buns

Ingredients
- 1/3 oz. vanilla sugar
- 1 ½ oz. rum
- 1 ¾ oz. granulated sugar
- 2 ¾ oz. eggs
- Approx. 4 oz. milk*
- 1 ½ oz. yeast

Melted butter for dipping and brushing icing sugar

4 oz. clarified butter, firm and mouldable
1/2 oz. salt

For preparing the sample, heat the milk to approx. 20°C, dissolve the yeast. Add the flour and work together well. Let rise until volume has doubled.

Grate the eggs, yolk, granular sugar, rum, vanilla sugar and lemon rind until frothy.

Mix together the sample, egg mixture and remaining flour. Halway through mixing add the clarified butter and salt, work together well, pat into a smooth loaf of dough.

Roll out the yeast dough ½–¾” thick. Cut out circles of approx. 1¼” in diameter, dip in butter, arrange in a buttered pan and brush with butter. Let rise as approx. 30°C until almost doubled in volume.

Place the oven at 200°C for approx. 30 minutes, then once more brush with butter and let cool briefly.

Sprinkle with icing sugar, arrange on the plates and serve with vanilla custard.
Café Hawelka is by one of Alfred Loos’ students and has never been altered. In September 1939 the war forced the Hawelkas to leave the country and close down their business. When they returned in 1945 they found that, as if by a miracle, it had not been damaged in the air raids and they reopened it in autumn of the same year. That winter Mr. Hawelka took a wheeled cart to get firewood from the Wienerwald, while Mrs. Hawelka made coffee on the wood stove and started her coffee house again. The place soon became a second home for writers and intellectuals of the time, where they could forget their misery of a poor and occupied city. Writers like Friedrich Torber, Hilde Spiel and Hans Weigel were there almost every day. Heimito von Holzen and people from Paris and the Netherlands arrive at Café Hawelka. In the end, the reason for that is that Mr. Hawelka does not renovate.

In the late fifties, when modern espresso bars opened up all over Vienna and many traditional coffee houses had to close, Café Hawelka did not have any problems, due to its faithful regulars. All Leopold Hawelka did to modernize his place was to buy an espresso machine, which is still working. In the sixties he installed another innovation, which is now common in many Viennese Coffee houses, a poster wall to advertise the latest shows and exhibitions. His collection of paintings by promising newcomers grew, each of which he bought at market price.

Now that the golden times are over, the world surroundings Café Hawelka has changed a lot. People are constantly in a rush and do not have the time to spend a whole afternoon in a coffee house. Café Hawelka though has not changed at all. Time seems to stop as soon as you enter. Mr. Hawelka still works the day shift and personally welcomes every single guest who enters his empire, as he likes to call it, and always does his best to find a place to sit for everyone. “The boss always has to be there”, in his motto. Mrs. Hawelka sadly passed away almost three years ago, but nevertheless the delicious smell of her legendary bohemian Buchstilfen still fills the air of the place every night, like it has for the last 63 years.

Vienna is regarded as one of the best cites in the world to live in, and that’s not only because of its broad range of arts of all genres. It is also because of the most lovely location on the Danube river, encircled by the hills of the Wienerwald. And certainly because of its epicurean delights. Even early visitors reported that Vienna is a city of gourmets. Viennese cuisine is a mighty melting pot, in which influences from various regions and cultures were put. Just remember that about 100 years ago, the great empire of the Habsburgs ruled between Salzburg and the Black Sea, from Prague to Trieste and Budapest. The many peoples of the monarchy wandered around a lot, seeking jobs, chances to earn some money, and better living conditions. Others got around because of their duties in administration, or as teachers, soldiers and officers.

Some felt drawn to the capital and imperial seat of Vienna, to take on a somewhat proverbial task; to become a maid in a grand household, or a cook. And these cooks from Hungary, Bohemia and Moravia brought with them their local dishes, just as they let foreign influences and newly learned things affect their daily work.

Today the learned gourmet applies the elegant term ‘fusion’ to this cuisine, meaning a successful mixture of traditional and new. Back then nobody thought of impressing people apart from their masters. It’s obvious that this cuisine was thoroughly mixed. The famous Viennese Tirolergulasch, named after the well-known local horse car-rages and their drivers, originated in Hungary. Who makes the best ‘Palatschinken’ (pancakes) is still a major issue between Vienna and Budapest, and the world-famous Wiener Schnitzel has predecessors and close relatives in the north of Italy, e.g. the Escalope Milanese. In this special case, you should give preference to the Viennese version, tender veal wrapped in a delicate coat of ground old white bread, then carefully fried in a pan.

Would you like to know some more of these culinary imports? For instance Topfengolatschen, exquisite flaky pastry filled with a bewitchingly sweet cream cheese crème, does not have its origin in Vienna either. And still it is a major element of a Viennese breakfast and even more the traditional afternoon coffee break. And don’t forget Gugelhupf and Kasierschmarren, both of them sweet, Tafelspitz and Bruckfleisch (beef variations) – those dishes and many, many more are integral parts of everyday Viennese cuisine, and available daily in every traditional restaurant that deserves that name.

For all of you who avidly succumb to the above-mentioned delights, and want to fry, roast, boil or steam something yourself – Martina Hohenlohe has compiled a practical handbook of Viennese cuisine with much local colour and a broad culinary palette. She mentions insightful and historical facts, and captures with precise instructions, which will enable any interested and reasonably skilled cook to prepare the many delicacies. Practice makes perfect, and with this introductory cookbook, success should not be far off. Enjoy your meal!
Publishing: the future is here

By Stefanie Muszki

Faced with a new era of knowledge distribution through the internet, the publishing business had to adapt and find new ways of retaining their audiences. Almost any information is available online, with normal users as well as scientists now able to access innumerable websites with scientific content; something that in the past was only possible through paid subscriptions to different journals. What took hours of night-time and weekend research in university libraries can now be done via the internet. Whoever thought there was only one way to get quality information, now experiences something completely different: everyone can access almost everything and get any information they need.

Scientists’ lives have become easier with the advent of the internet and online databases containing many different journals. Cross-references, linked bibliographies and related articles make it possible to obtain even broad fields of research in just a few clicks. One does not need multiple subscriptions or a large library anymore; only a PC with access to the World Wide Web.

PubMed for example, a great source of research for physicians and radiologists, includes around 3,800 biomedical journals and grows by 500,000 articles per year. It is one of the leading databases of citable articles worldwide, and not only in the English language. Established medical journals also publish their articles online, with access open to basically everyone. Seeing these dimensions, it is clear that an old-fashioned library could never cope with such a volume of information and increase without expanding rooms and employees every week. Online platforms gather an incredible variety of knowledge in one place.

Looking at the past, publishing for authors was not easy. After writing a manuscript, several copies had to be sent via postal mail to the Editor-in-Chief, who would then forward it to reviewers who had to return the manuscripts with the changes on paper. Then it went back and forth between the various people involved until the manuscript was accepted. The period between submitting and publishing could last several months, beside being dependant on postal companies not striking in the meantime. Nowadays, everything can be done much quicker, more efficiently and conveniently for everyone through online submission tools, which handle all processes with a much lower requirement of human resources. New ways of peer review, such as the automatic peer review, where manuscripts are forwarded automatically to reviewers, or public peer review, where parts of manuscripts are published to be evaluated in an open discussion, have also changed old routines.

Seeing the new era with regard to the industry, big publishing houses customise their products according to a client’s behaviour and offer most of the content of their journals online, which also causes internal economic and strategic shifting. On one side, publishing is one of the obligations for every scientist’s career, so established journals could stay expensive to access for readers and authors. On the other side, publishing online is much more feasible for individuals, by creating their own website and not being dependent on companies. Publishing companies did not want to lose their sovereignty by giving access to scientific quality material and at the same time, the demand for verified quality arose out of the unfamiliar load of material available – a determinant was needed that could show the reliability of an article, and the authority and prestige of the origin.

The Impact Factor, based on the number of articles published and subsequent citations of those articles in other journals, is now a great influence and a means by which journals can be ranked. Focusing on special fields, which may establish the journal in that field, or a having a continuous supply of material guaranteeing a steady level of publications for example, may increase the journal’s potential to maintain a high Impact Factor.

Some people were not very optimistic about the new technical achievements and the internet. Some feared it would destroy quality content, function as a platform for nonsense and false literature, and even kill books and journals! But almost none of these fears came true – quality content is even more widespread and accessible to more scientists than ever, grey literature does appear, but thanks to established and controlled networks can be identified as such, and books did not disappear at all.

In communication sciences, there is the theory of complementary media, which says that no medium will substitute or replace another, but may change forms and functions of old media. Radio did not kill newspapers, TV did not kill radio, and the internet has not killed books and journals.

The new age of information can also lead to a new way of thinking about knowledge sharing. It took centuries to extend the chance to read and write beyond only the privileged elements of society, and it is – from a humanistic point of view – an achievement that today everyone can receive and share knowledge, especially in science. Thus, all of us should be aware of the benefits of being on the ‘good side’ of the information gap, which still exists. Information is still the most precious property.

New improved Impact Factor: 2.554

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