

BY PETER HUPPERT

German Röntgen Congress 2018 to focus on heart, neuroradiology and digital communication

I would like to invite you to the 99th German Röntgen Congress, which will take place from May 9–12, 2018 in Leipzig, Germany.



'Radiology connects' is the motto for the 99th German Röntgen Congress, which will take place from May 9–12, 2018 at Leipzig's ultra-modern Congress Centre.

The motto for the congress is 'Radiology connects', and it will focus on the mediating and integrating function of radiology in relation to connecting diagnostic and therapeutic knowledge, on bringing specialist disciplines that are part of the respective service processes even closer, as well as on offering a platform to the internal and regional service networks.

The three thematic focuses of the German Röntgen Congress 2018 are:

- Heart and vessels: diagnostics and intervention
- Neuroradiology: diagnostics and intervention
- Digital communication in the field of radiology

The congress will also place an emphasis on imparting basic clinical knowledge in line with radiological specialist knowledge, and

on the formation of diagnostic as well as therapeutic expertise and the presentation of new channels of communication and service.

The German Röntgen Congress 2018 will of course provide a diverse and wide-ranging programme for all occupational groups. You can look forward to established formats and tools such as RSNA Diagnosis Live™ or the Interactive Learning Platform of the German Röntgen Society with digital case collections, as well as 'Intervention live', a new course facilitating interaction with a combination of video-based case presentations and digital tools. What's more, you will also be able to listen to many exciting speeches as part of 'RöKo International' and 'Forum IT'.

At the opening event a highlight speech will be made by Cornelius Schmalz, MD, Head of Unit

Strategy – Health Research of the European Commission in Brussels on 'Research politics of the European Union in the healthcare sector'. Jim Reekers, MD, Professor of Radiology, AMC University of Amsterdam, will give a presentation titled 'Diabetic foot perfusion imaging: The truth behind arterial tubes', as part of his radiological lecture.

Look out for more information on our website over the next couple of months. I look forward to welcoming you to the 99th German Röntgen Congress in Leipzig.

Prof. Dr. Peter Huppert is head of the Institute of Radiology, Neuroradiology and Nuclear Medicine at Klinikum Darmstadt hospital, Germany, and will act as the president of the 99th German Röntgen Congress.

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See how we create value through Innovation and Digital Technologies, by equipping today's Healthcare Professionals with tomorrow's Innovative Solutions.

Join our **Lunch Symposium** on Friday, March 2nd, 12.30-13.30, room N and ask us about our **Live Sessions** at our booth X2/221.

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BY WOLFRAM STILLER

Strategies for dose reduction in computed tomography: from technical concepts to clinical practice

Since its introduction in the 1970s, technical improvements have constantly extended the range of clinical applications and made new radiodiagnostic indications accessible in the field of computed tomography (CT).

The rapid growth in the number of CT examinations over the past four decades can be attributed to the wide availability, speed, and diagnostic benefits of this imaging modality. At the same time, public health concerns have arisen regarding the radiation exposure to patients and the general population caused by CT examinations.

As CT examinations always require patients to be exposed to some level of ionising radiation, dose reduction is an imperative when applying CT in clinical practice and approaches for reducing the dose associated with CT are required. To this end, different strategies for dose reduction in CT have been developed, spanning technical approaches as well as specific examination techniques applied in clinical practice.

To date, several technical possibilities such as automatic tube current modulation (ATCM) and automated tube voltage selection as well as dynamic beam collimation are available for reducing the dose associated with CT examinations. ATCM adapts the tube current to compensate for variations in patient attenuation, resulting in comparable image quality independent of body region and patient constitution and the optimisation of the applied dosage. Automated tube voltage selection aims at optimising tube potential depending on patient size and diagnostic task. For example, applying lower tube potential for contrast-enhanced acquisitions results in higher image contrast

outweighing potentially increased noise at lower radiation exposure.

Of late, the paradigm of applying advanced image reconstruction algorithms to CT image data has opened a field of promising developments with great potential for widespread application in clinical routine. The idea behind software-based methods for iterative image reconstruction (IR) in CT is the simultaneous reduction of image noise and the improvement of overall image quality. As noise and overall quality of the resulting image data are directly linked to the radiation exposure a CT examination is associated with, a reduction or suppression of noise via the application of iterative image reconstruction algorithms consequently allows a reduction in dose. Currently, several different types of iterative reconstruction algorithms, including hybrid-, model-based, and full statistical iterative algorithms, are readily available. Compared to traditional filtered back projection (FBP), the application of IR may lead to changes in image texture and in the depiction of image detail. The distinctly different 'look-and-feel' of iteratively reconstructed image data is often felt to be a challenge that has to be addressed when implementing advanced CT image reconstruction in clinical routine.

While all scanner technology currently available should be exploited for reducing the radiation exposure of CT examinations, careful selection and individual adaptation of

the CT protocol parameters to each specific clinical indication have the biggest potential to enable systematic dose reduction in clinical practice, e.g. for paediatric and chest CT examinations. For paediatric body imaging, lowering the tube voltage from 120 kV_p to 100 kV_p will result in increased conspicuity of iodine-perfused vessels and tissues. The strategy of lowering tube voltage to 100 kV_p or 80 kV_p can also be applied in the chest CT of adults, albeit having to apply higher tube current settings. Decreasing the tube voltage will also enable reduction of radiation exposure to the patients if the tube current modulation settings are concurrently reviewed. In addition to specifically tuning acquisition parameters of paediatric CT protocols to different patient weight categories, careful centring of the patient, effective immobilisation and correct positioning of the arms are essential.

Optimisation of CT acquisition protocols with the goal to reduce dose in clinical practice should be a team effort based on a systematic evaluation and review of the quality of clinical CT image data on a 'per acquisition protocol/per indication' basis. The evaluation should determine whether appropriate image quality that allows confident diagnosis is regularly achieved. It

should consist of a stepwise optimisation of each acquisition protocol with the aim to exploit available technology (e.g. automatic exposure control mechanisms, iterative reconstruction algorithms, etc.) while keeping radiation exposure below national diagnostic reference levels (DRLs) and ensuring image quality that is appropriate for the respective indication.

While dose reduction is imperative in CT, excessive reductions will result in a loss of diagnostic image

quality. Therefore, dose reduction of CT examinations in clinical practice is limited by the image quality requirements inherent to each specific diagnostic task to ensure confident diagnosis.

Dr. Wolfram Stiller is a physicist at the University Hospital in Heidelberg, Germany. He is dedicated to research in the field of x-ray computed tomography. He is a member of the ESR Radiation Protection Subcommittee and the EuroSafe Imaging Steering Committee.

EuroSafe Imaging Session

Thursday, March 1, 10:30–12:00, Room X
EU 2 Strategies for dose reduction in computed tomography: from technical concepts to clinical practice

Chairpersons: W. Stiller; Heidelberg/DE
R.W.R. Loose; Nuremberg/DE

- » Chairperson's introduction
W. Stiller; Heidelberg/DE
- » Systems for dose reduction in CT: more than automated exposure control
M. Prokop; Nijmegen/NL
- » Iterative image reconstruction for dose reduction in CT: technical background and concepts for clinical practice
P.B. Noël; Munich/DE
- » Dose reduction strategies in paediatric CT
E. Castellano; London/UK
- » Adapting protocols towards dose reduction in chest CT
D. Tack; Baudour/BE
- » Dose reduction and image quality: when low is too low
S.T. Schindera; Aarau/CH

This session is part of the EuroSafe Imaging campaign.

EUROSAFE IMAGING POSTER EXHIBITION

Browse through the posters of the **EUROSAFE IMAGING POSTER EXHIBITION** in the 'ECR Online & EPOSTM Lounge' (1st floor) to learn more about radiation protection initiatives worldwide.

And join us at the **EUROSAFE IMAGING POSTER PRESENTATION SESSION** at the Voice of EPOSTM stage 1 on **Saturday, March 3, 11:00–12:00**



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