8th Breast Care Day at ECR 2018

Get the latest in breast diagnostics

Feb. 28, 2018
10:30 am – 5 pm
Austria Center
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Abstracts to the presentations.

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SIEMENS Healthineers

8th Breast Care Day at ECR 2018

Get the latest in breast diagnostics

What are the current discussions and trends in breast diagnostics?

Don't miss the chance to be part of the Breast Care Day – the premiere event at ECR 2018!

Siemens Healthineers and Bayer welcome you to the 8th Breast Care Day.

Free of charge for all registered ECR participants.

The perfect combination of the latest studies, daily practice and a future outlook in open discussions with leading experts:

- High-risk screening with breast MRI
- Reading approaches and protocols
- Mammography – from improving morphological assessment to functional imaging
- Big data and precision medicine

Satellite Symposia jointly organised by Bayer and Siemens Healthineers

10:30 am – 12:00 am:

High-risk screening with breast MRI – today and in the future

Chair: Chantal Van Ongeval; Leuven/Belgium

Phenotype-genotype correlation and radiological screening for breast cancer in gene mutation carriers

Chantal Van Ongeval; Leuven/Belgium

Ten-year experience of population-based dynamic breast MR Imaging: the Study of Health in Pomerania (SHIP)

Robin Bülow; Greifswald/Germany

Gadolinium retention – impact on breast MRI?

Jörg Barkhausen; Lübeck/Germany

Radiomics in breast imaging

Lale Umutlu; Essen/Germany

12:15 pm – 1:45 pm:

Multimodality lunch symposium: Reading approaches and protocols

Chair: Ritse Mann; Nijmegen/The Netherlands

ABVS and personalised breast cancer screening

André Grivegnée; Brussels/Belgium

Approaches to accelerating and standardizing DBT reading in screening – what's new?

Final results of the Malmö Breast Tomosynthesis Screening Trial

Sophia Zackrisson; Malmö/Sweden

Breast Elastography: Examination protocol and imaging interpretation

Christina Gkali; Athens/Greece

Progress on whole body MRI use for advanced breast cancer

Anwar Padhani; Northwood, Middlesex/United Kingdom

2:00 pm – 3:30 pm:

Digital Mammography – from improving morphological assessment to functional imaging

Chair: Luis Javier Pina Insausti; Pamplona/Spain

Impact of tomosynthesis angular range on mass conspicuity in patients with dense breasts

The radiologist's view

Paul Fisher; Stony Brook, NY/USA

Impact of tomosynthesis angular range on mass conspicuity in patients with dense breasts

The physicist's view

Wei Zhao; Stony Brook, NY/USA

Synthetic 2D mammography with digital breast tomosynthesis: the new mammography

Paola Clauser; Vienna/Austria

Clinical utility of Contrast-Enhanced Dual Energy Mammography (CEDEM)

Luis Javier Pina Insausti; Pamplona/Spain

Comparison of Contrast-Enhanced Dual Energy Mammography and Contrast-Enhanced Digital Breast Tomosynthesis for lesion assessment and radiation doses

Paul Fisher; Stony Brook, NY/USA

4:00 pm – 5:00 pm:

Big data and precision medicine in breast care

Chair: Tina Manoharan; Forchheim/Germany

Integrated decision support for improved patient outcome

Tina Manoharan; Forchheim/Germany

Improving the clinical utility of digital breast tomosynthesis using novel software applications

Ritse M. Mann; Nijmegen/The Netherlands

The future of MR mammography – radiomics?

Clemens Kaiser; Mannheim/Germany

Personalized therapy through optimization of diagnostic data in multi-disciplinary team decisions

Dr. Ritse M. Mann; Nijmegen/The Netherlands

1st Symposium: High-risk screening with breast MRI – today and in the future

10:30 am - 12:00 noon

Chair: Prof. Dr. Chantal Van Ongeval; Leuven / Belgium

Phenotype-genotype correlation and radiological screening for breast cancer in gene mutation carriers

Author: Prof. Dr. Chantal Van Ongeval; Leuven/Belgium

Abstract: Approximately 5%-10% of breast cancers (BC) are hereditary; the most common mutation is BRCA 1, BRCA 2 and CHEK2. It has been shown that breast cancer gene mutation carriers (BCGM) have different clinical, histological and immune-phenotypic features. In BRCA1 BC presents at younger age (<40y) compared to BRCA2 and CHEK2 and is often more aggressive, presenting as medullary-like, triple negative breast cancers. Notwithstanding some studies reporting different mammographical characteristics of BC in BCGM, a study on imaging characteristics of BC in BRCA 1/ 2 and CHEK2 performed in University Hospitals Leuven (poster EUSOBI 2016) did not prove any difference compared to BC in non-mutation carriers. Breast tumor recurrence (first, second and contralateral) risk is significantly higher in BCGM carriers compared to non-mutation carriers, with CHEK2 most frequently showing an early and contralateral recurrence. Age at first breast cancer is also a strong risk factor for cumulative contralateral BC in BRCA1/2 carriers. Annual MRI alternating mammography and/or ultrasound is probably the most effective screening strategy in BCGM. Screening benefits, associated risks, and acceptance of false-positive results should be discussed.

Learning objectives:

- To learn about the immunohistochemical and radiological characteristics of breast cancer in BRCA 1, BRCA 2 and CHEK2 gene mutation carriers
- To understand the radiological follow-up program for breast cancer detection in gene mutation carriers

Ten-year experience of population-based dynamic breast MR Imaging: the Study of Health in Pomerania (SHIP)

Author: Robin Bülow, MD, M.Sc.; Greifswald/Germany

Abstract: Robin Bülow, Ralf Ohlinger, Katrin Hegenscheid

Purpose: To present 10-year results of dynamic breast MRI in the population-based Study of Health in Pomerania (SHIP).

Methods and Materials: Between 2008 and 2012, 774 women (51±12.9 years (range 20 to 83 years) participated in dynamic breast MRI with T1-weighted three-dimensional MR images (repetition time msec/echo time msec, 8.86/4.51; flip angle, 25°) acquired with a 1.5-T MR unit before and 1 to 5 minutes after a gadobutrol bolus injection of 0.1 mmol per kilogram of body weight. Images were analyzed by two radiologists independently using the American College of Radiology BI-RADS–MRI Classification Form. In case of disagreement a consensus reading was performed. BI-RADS IV and V breast lesions were disclosed to the women with individual recommendations for follow-up. Between 2013 and 2017, MRI follow-up was realized in 275 (35.5%) women and 228 women participated additionally.

Results: At baseline 113/774 women (recall rate 14.6%) had breast lesions of category BI-RADS IV (n=106) or BI-RADS V (n=7): 84 mass lesions, 15 foci and 29 non-mass lesions. Diagnostic follow-up was completed in 111/113 (97.3%) women. In 21/113 (18.6%) women breast biopsy was performed confirming malignancy in 7/774 (0.9%) women. In the 5-year-follow-up group 3/275 women with new mass lesions (BI-RADS IV) have been detected (recall rate 1.1%) and malignancy was confirmed in 2/275 (0.73%).

Conclusion: Population-based dynamic breast MRI is feasible and has a recall rate of 14.6% at baseline and 1.1% during 5-year-follow-up. Mass lesion was the most detected lesion type. Malignancy was confirmed in 0.9% women at baseline.

Gadolinium retention – impact on breast MRI?

Author: Prof. Dr. Jörg Barkhausen; Lübeck/Germany

Abstract: More than 30 years ago, contrast-enhanced MRI emerged as a new technique in clinical breast imaging and over the last three decades numerous clinical studies have shown excellent results for the detection and characterization of breast lesions. Despite the most recent improvement of high-resolution and diffusion-weighted MRI, dynamic contrast-enhanced sequences are still considered as the key component of any breast MRI examination.

The applied gadolinium-based contrast agents (GBCAs) were considered as very safe compounds until the association between nephrogenic systemic fibrosis and GBCAs was suspected in 2006. Additionally, in late 2013 Kanda and colleagues described increased signal intensity in the dentate nucleus on unenhanced T1-weighted MR images as a consequence of repetitive previous GBCA administrations.

Although no clinically relevant adverse events have yet been associated with the detection of gadolinium in the brain, the results of these studies must be taken seriously. With respect to breast MRI, these issues are especially important for repetitive breast cancer screening in high-risk patients for example with BRCA mutations. In this lecture the results of the most recent clinical trials addressing this topic and the regulatory recommendations will be presented and discussed in a comprehensive manner.

Learning objectives:
- To gain knowledge of the pharmacokinetics of different MR contrast agents
- To discuss the potential risks of gadolinium based contrast agents
- To learn about the most recent recommendations and guidelines

Radiomics in breast imaging

Author: Prof. Dr. Lale Umutlu; Essen/Germany

The Abstract is not available.

2nd Symposium: Multimodality lunch – Reading approaches and protocols

12:15 pm - 1:45 pm

Chair: Dr. Ritse Mann; Nijmegen /The Netherlands

ABVS and personalised breast cancer screening

Author: Prof. Dr. André Grivegnée; Brussels/Belgium

Abstract: Dense fibroglandular tissue has an important impact on breast cancer screening. While mammography remains the gold standard in breast cancer screening (BCS), the approach has evolved and more personalised programs are now emerging. We will present our experience in BCS including ultrasound (Hand Held (HH) and/or Automated 3D) for patients having heterogeneously and extremely dense breasts. The conclusions of this study conducted in the ASSURE PROJECT (EU funded) show a higher cancer detection with an acceptable recall rate.

The personalized workflow for BCS in our clinic has been defined as: Mammography (including DBT) followed by ABVS decided on the basis of volumetric density evaluation; then rapid overview by the radiologist of the examinations. If any positive or doubtful finding is seen, HHUS or dedicated mammogram is immediately performed. In addition, the use of CAD for mammography and ABVS is programmed as an evaluation process in our clinic.

Learning objectives:

- Ultrasound examination increases breast cancer detection rate with an acceptable recall rate
- ABVS is at least equivalent to HHUS in this application; furthermore it allows a quality assurance which is mandatory in BCS
- ABVS can be utilised in personalised breast cancer screening workflow in a reasonable cost-effective approach

Approaches to accelerating and standardizing DBT reading in screening – what's new?

Final results of the Malmö Breast Tomosynthesis Screening Trial

Author: Ass. Prof. Dr. Sophia Zackrisson; Malmö/Sweden

Abstract: The superiority of digital breast tomosynthesis (DBT) compared to digital mammography (DM) for cancer detection in screening is undoubted, as indicated by the results from several large, prospective screening trials. One of the challenges for implementation of DBT in screening is that longer reading times are reported for DBT, up to twice as long as for DM. In high-volume screen reading, ways to improve reading times with sustained sensitivity and specificity are warranted. The image protocols vary between trials, from two-view DM+DBT, two-view synthetic DM+DBT and one-view DBT, although with quite similar results on detection and somewhat mixed effects on recalls. This presentation will include a discussion on what is the optimal image protocol. Further, does the use of narrow- versus wide-angle DBT make a difference? Do we need double reading with DBT? Will artificial intelligence systems replace one reader? Are thicker slices, slabbing, a way forward? How much does experience add? Finally, some of the final results from the Malmö Breast Tomosynthesis Screening Trial will be presented.

Learning objectives:

- To be familiar with the different image protocols used in prospective trials
- To acknowledge ways to accelerate and standardize DBT screen-reading

Breast Elastography: Examination protocol and imaging interpretation

Author: Dr. Christina Gkali; Athens/Greece

Abstract: In recent years the use of elastography in addition to sonography has become a routine clinical tool for the characterization of breast masses. Studies have investigated the improvement of specificity in differentiating benign from malignant breast masses. Therefore, additional use of elastography could help to reduce the number of unnecessary biopsies in benign breast lesions especially in category IV lesions of the ultrasound breast imaging reporting data system (US-BI-RADS). Ultrasound elastography is a cheap, readily available, useful, quick, non-invasive method in the diagnosis of breast lesions but it needs specific training as well as acknowledging the technical and pathological factors which may influence it. Both Strain and ARFI (Shear Wave Elastography) methods have been evaluated. Whereas Strain elastography results in qualitative imaging of tissue stiffness due to induced compression, ARFI (SWE) elastography displays quantitative and qualitative information of tissue displacement. A standardized protocol is essential for an adequate and effective examination, also helping reducing the dependence from operators. Furthermore, knowledge of pitfalls that can be encountered when ultrasound elastography is performed may help to avoid erroneous images interpretation. Interesting and rare cases will be presented and interpreted.

Learning objectives:

- To present the technique of both Strain Elastography (SE) and Acoustic Radiation Force Impulse Imaging (ARFI)/ Shear Wave Elastography (SWE).
- To suggest an appropriate breast SE and ARFI (SWE) imaging examination protocol.
- To interpret the elastographic imaging findings in interesting and rare breast cases, pathology proven.

Progress on whole body MRI use for advanced breast cancer

Author: Prof. Dr. Anwar Padhani; Northwood, Middlesex/UK

Learning objectives:

- To learn how WB-MRI addresses limitations of current imaging for bone metastatic detection and response
- To understand how the biology of metastatic bone disease affects imaging findings
- To enumerate patient care indications for WB-MRI in metastatic ABC
- To understand how WB-MRI can promote high precision oncology in MBC with bone disease

3rd Symposium: Digital Mammography – from improving morphological assessment to functional imaging

2:00 pm - 3:30 pm

Chair: Prof. Dr. Luis Javier Pina Insausti; Pamplona/Spain

Impact of tomosynthesis angular range on mass conspicuity in patients with dense breasts

The radiologist's view

Author: Ass. Prof. Paul Fisher, M.D.; Stony Brook, NY/USA

The physicist's view

Author: Prof. Wei Zhao, PhD; Stony Brook, NY/USA

Abstract: Purpose: Recent studies have suggested that cancer detection rates for digital breast tomosynthesis (DBT) are poor for patients with heterogeneously to extremely dense breasts. These studies have been predominantly conducted on narrow-angle DBT. Increasing angular range (AR) reduces breast structural noise and increases image contrast for masses, potentially improving mass detection in dense breasts. We investigate the effect of AR on mass detectability using a previously validated cascaded linear system model (CLSM) for DBT, and compare theoretical results with clinical findings in an IRB-approved study.

Materials and Methods: Mass conspicuity in DBT was modelled as a function of AR using a normalized detectability index d', incorporating breast structural noise and image contrast. DBT images were acquired for 6 patients with heterogeneously or extremely dense breasts on both the Hologic Selenia Dimensions (AR = 15°) and the Siemens MAMMOMAT Inspiration (AR = 50°). Two breast radiologists were presented with both sets of images for each patient and compared lesion conspicuity on a five-point scale (-2: lesion much more conspicuous on narrow-angle DBT, to +2: lesion much more conspicuous on wide-angle DBT).

Results: Mass detectability was predicted to increase with increasing AR due to reduced structural noise and increased contrast in the reconstructed image slices. Increasing AR from 15° to 50° would increase detectability of 2, 5 and 10 mm masses by 85.3%, 87.5% and 87.9%, respectively. Clinical findings corroborated simulation results, with mass conspicuity shown to be superior for wider-angle DBT, with a mean score of 0.89 (95% CI: 0.44, 1.44). Importantly, masses found in areas with high masking risk (defined as high local density as characterized by the radiologist) were more conspicuous on wider-angle DBT.

Conclusion: Using a normalized detectability index d', mass conspicuity was shown to increase with increasing AR. These results were corroborated by a pilot clinical study, and motivate an ongoing larger scale study to demonstrate whether DBT with wider AR provides superior mass conspicuity for patients with heterogeneously to extremely dense breasts.

Learning objectives:

- To understand the imaging science of the impact of AR in DBT image quality
- To compare the mass conspicuity in DBT with wide and narrow AR for patients with dense breast

Synthetic 2D mammography with digital breast tomosynthesis: the new mammography

Author: Dr. Paola Clauser; Vienna/Austria

Abstract: The introduction of digital breast tomosynthesis (DBT) in association with digital mammography (DM) is rapidly changing clinical practice. DBT is becoming the new mammography, thus the new first line examination – in association with DM - for women in the screening and assessment setting.

The need to perform two examination (DM and DBT) raised concern regarding the increased radiation exposure.

Synthetic 2D mammography (SM) is a 2D image reconstructed from the DBT projections. SM is similar to DM and it could be used instead of DM to avoid the acquisition of two examinations.

Learning objectives:
- Radiation dose of DM and DBT.
- What is synthetic 2D mammography.
- Current evidence in favor of the introduction of SM mammography to replace DM as an adjunct to DBT in the clinical practice.

Clinical utility of Contrast-Enhanced Dual Energy Mammography (CEDEM)

Author: Prof. Dr. Luis Javier Pina Insausti; Pamplona/Spain

Abstract: Contrast-Enhanced Dual Energy Mammography (CEDEM) is a development of digital mammography. By using dual energy (conventional low energy mammography plus high energy mammography) after the administration of a bolus of intravenous iodinated contrast medium, a morpho-functional image of the breast is acquired. This technique joins the high spatial resolution of conventional digital mammography with functional information based on neoangiogenesis. The indications of this technique for clinical use include: Problem–solving technique after inconclusive mammography, preoperative assessment of breast cancer, follow-up of scars after conservative treatment, follow-up of intermediate risk patients (borderline histological lesions, such as lobular carcinoma in situ, atypical ductal or lobular hyperplasia, as well as positive family history of breast cancer). In fact, the majority of indications are those of MRI, including the contraindications for MRI (pacemakers, claustrophobic patients, etc.). Furthermore, CEDEM has fewer false negative results than MRI. Nevertheless CEDEM has some limitations: The sensitivity is lower for ductal carcinomas in situ, lesions out of the field of view of the detector are missed and some benign lesions can enhance after contrast administration. CEDEM is contraindicated for patients allergic to iodine as well as for patients with renal insufficiency.

Learning objectives:
- To become familiar with Contrast-Enhanced Dual Energy Mammography (CEDEM)
- To learn the main indications for this technique
- To learn the main limitations of CEDEM

3rd Symposium: Digital Mammography – from improving morphological assessment to functional imaging

2:00 pm - 3:30 pm

Chair: Prof. Dr. Luis Javier Pina Insausti; Pamplona/Spain

Comparison of Contrast-Enhanced Dual Energy Mammography and Contrast-Enhanced Digital Breast Tomosynthesis for lesion assessment and radiation dose

Author: Ass. Prof. Paul Fisher, M.D.; Stony Brook, NY/USA

Abstract:

Purpose: Digital breast tomosynthesis combined with contrast-enhanced dual energy mammography (DBT+ CEDEM) is being investigated for diagnostic accuracy. Contrast-enhanced digital breast tomosynthesis (CEDBT) provides coregistered low energy DBT and 3D contrast enhancement map. Synthetic CEDEM may also be generated and paired with synthetic mammogram. This study compares CEDBT with CEDEM for lesion assessment and dose efficiency.

Method and materials: A Siemens MAMMOMAT Inspiration DBT system modified for dual energy contrast-enhanced imaging is used. Patients with BIRAD 4 and 5 lesions and scheduled for biopsy were recruited for an IRB-approved CE imaging study. CEDEM images were acquired 120 seconds after injection of iodine contrast agent, followed by CEDBT acquisition under the same breast compression. Eleven malignant lesions from 12 patients were confirmed by pathology result. A reader study of side-by-side comparison between CEDEM and CEDBT is performed to assess lesions on 1) Contrast enhancement level and 2) Margin identification, using a 5-point scale from -2 (CEDEM much better) to 2 (CEDBT much better). The radiation dose recorded by the DBT system is reviewed for DBT+CEDEM and CEDBT.

Synthetic CEDEM is created with dual-energy subtracted projections from CEDBT using software developed by Siemens Healthineers.

Results: For malignant lesions, CEDEM shows higher enhancement level than CEDBT slices (mean score=-0.64; 95% CI: -1.09, -0.18). CEDBT shows lesion margin better than CEDEM (mean score=0.78; 95% CI: 0.11, 1.44). In CEDBT slices, background parenchymal enhancement is less intense, and motion artifact is less severe than that in CEDEM. On average, CEDBT reduces dose by 32.8% ± 9.9% compared to DBT+CEDEM (average dose 1.91 ± 0.74 mGy vs. 2.86 ± 1.04 mGy). Synthetic CEDEM has similar mammographic appearance to CEDEM, and shows the same enhanced lesions.

Conclusion: CEDBT provides better lesion margin identification and reduces structural noise due to background parenchymal enhancement and motion compared to CEDEM, while the intensity of lesion enhancement is lower. CEDBT uses lower dose than DBT+CEDEM. Synthetic CEDEM can be created from CEDBT to quickly identify lesion enhancement.

Clinical relevance/application: With the advent of DBT replacing FFDM, contrast imaging can potentially be done in full 3D setting (CEDBT) facilitated by synthetic 2D images (synthetic mammogram and synthetic CEDEM).

4th Symposium: Big data and precision medicine in breast care

4:00 pm - 5:00 pm

Chair: Dr. Tina Manoharan; Forchheim/Germany

Integrated decision support for improved patient outcome

Author: Dr. Tina Manoharan; Forchheim/Germany

Abstract: In this segment we'll focus on value-based healthcare, exploring how Integrated Decision Support (IDS) can help make more precise diagnosis and therapy decisions in multi-disciplinary teams, improving patient health outcome, while keeping the clinical pathway cost-efficient. Emphasis will be placed on multi-modal data integration, including imaging, pathology, lab, genomics and other relevant clinical information.

Improving the clinical utility of digital breast tomosynthesis using novel software applications

Author: Dr. Ritse M. Mann; Nijmegen/The Netherlands

Abstract: Digital breast tomosynthesis (DBT) is rapidly replacing mammography as standard of care due to its higher sensitivity and specificity. In clinical practice, in contrast to the screening situation, images are scrutinized in depth. Furthermore, the availability of ultrasound and MRI, if needed, require the DBT findings to be appreciated in a multimodality context. To deal with the large amount of data and the demanding requirements, software applications are indispensable to aid reading. To ensure detection of all lesions within the DBT dataset, novel CAD applications may help, not only localizing abnormalities on synthetic 2D slices, but also navigating directly to the most relevant slice in the tomosynthesis volume. For the rapid evaluation of findings within the tomo dataset, synthetic 3D images offer unique possibilities; showing tissue composition of possibly abnormal areas and clearly locating suspicious lesions in the breast. Novel tools that automatically segment and measure relevant findings further aid in reporting and in addition may reduce inter-reader variability. Finally, coupling studies from one modality to the next integrates the findings and allows for multimodal assessment of lesions. Consequently, current software developments have a powerful impact on the usefulness of DBT and multimodality imaging.

The future of MR mammography – radiomics?

Author: Dr. Clemens Kaiser; Mannheim/Germany

Abstract: Recently, terms like big data, radiogenomics and radiomics as a basis for precision-based medicine are an increasingly common topic for discussion. In MR mammography there is also more information to be retrieved from the images than the sole question of whether invasive carcinoma is present. However, MR mammography presents more challenges than the "optimization of the diagnostic return on investment" as the indications for MR mammography are still limited.

Personalized therapy through optimization of diagnostic data in multi-disciplinary team decisions

Author: Dr. Ritse M. Mann; Nijmegen/The Netherlands

Abstract: How can the use of diagnostic data in multi-disciplinary team decisions be optimized to enable more personalized therapy? Dr. Mann will walk us through this, using a specific breast cancer case as an example, covering everything from the complexity of preparation and patient empowerment to data transparency and accuracy in treatment decisions.

Not for use in the USA.

The statements by Siemens' customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

Siemens Healthineers Headquarters
Siemens Healthcare GmbH
Henkestr. 127
91052 Erlangen, Germany
Phone: +49 9131 84-0
siemens.com/healthineers

Published by Siemens Healthcare GmbH | PS XP 5778 0218 online |