Contribution ID: **41** Type: **poster**

Patient dose evaluation in digital breast tomosynthesis

Tuesday, 25 June 2019 13:30 (1h 30m)

Breast cancer (BC), a most common women malignancy, is often screened by mammography and ultrasound exams. Mammography provides early micro-calcification recognition, that is important for further cancer diagnosis. The imaging method-of-choice in the case of BC is an X-ray mammography (MG), also with the use of high-resolution digital modality. However, a planar MG has some limitations in terms of its sensitivity, especially in patients with dense and treated breasts. Moreover, MG contributes to the overall radiation burden of patients, and it is known that the risk for breast cancer is correlated with an exposure on ionizing radiation due to medical imaging. Patients, for whom MG study does not give a clear answer or is impossible to interpret, are often further diagnosed by contrast-enhanced breast magnetic resonance imaging (MRI). MRI is currently regarded as the most sensitive BC detection technique. On the other hand, it is limited by higher costs and lower availability and it provides higher rates of false positive cases. Relatively new method applied in breast neoplasms detection is digital tomosynthesis, introduced in 2011.

Classical planar (2D) mammography image characterized by a superposition of all breast structures projected onto the detector plane making difficult to recognize suspected areas. Tomosynthesis is a modality in which a series of breast exposures are performed at different angles (usually 9). Acquired images are subsequently used to reconstruct thin (1 mm) slices, which eliminates the problem of overlapping breast structures. This makes it easier to detect potentially suspicious changes, which can additionally be supported by specialist software such as CAD (Computer Aided Diagnosis).

Image and dosimetry data were used for studies performed in the digital tomosynthesis mode at the Department of Radiology and Imaging Diagnostics. So far, data from 219 patients have been collected and analyzed in a total of 357 CC / MLO projections in tomosynthesis mode. Additionally 70 of the patients had also classic 2D examination used as a reference in terms of dose.

Depending of the projection and mammography mode (2D-planar, tomosynthesis), the average glandular dose (AGD) increases with increasing breast thickness. It was observed that the increase of AGD is much faster in patients undergoing tomosynthesis. AGD for thomosynthesis was 30-60% higher depending on breast thickness, comparing with 2D examination (i.e. 1,36 vs 1,75 mGy for 63-72mm compressed breast thickness).

The diagnostic benefits of 3D imaging compensate for the risk associated with increasing the glandular dose in patients, especially in groups where the breast thickness after compression does not exceed 63mm.

Primary authors: KISIELEWICZ, Kamil (Centre of Oncology, Maria Sklodowska-Curie Memorial Institute, Krakow Branch, Poland); SAPIKOWSKA, Aleksandra (Centre of Oncology, Maria Sklodowska-Curie Memorial Institute, Krakow Branch, Poland); MAZUR, Lidia (Centre of Oncology, Maria Sklodowska-Curie Memorial Institute, Krakow Branch, Poland); KIEŁTYKA, Bartosz (Marian Smoluchowski Institute of Physics, Jagiellonian University in Krakow, Poland); RAWOJĆ, Kamila (University Hospital in Krakow – Department of Endocrinology, Poland); ŁUKASZEWSKA, Justytna; NAJBERG-PIERZCHAŁA, Dominika (Centre of Oncology, Maria Sklodowska-Curie Memorial Institute, Krakow Branch, Poland); GĄDEK, Monika (Centre of Oncology, Maria Sklodowska-Curie Memorial Institute, Krakow Branch, Poland); ŁUCZYŃSKA, Elżbieta (Centre of Oncology, Maria Sklodowska-Curie

Memorial Institute, Krakow Branch, Poland); DZIECICHOWICZ, Anna (Centre of Oncology, Maria Sklodowska-Curie Memorial Institute, Krakow Branch, Poland)

Presenter: KISIELEWICZ, Kamil (Centre of Oncology, Maria Sklodowska-Curie Memorial Institute, Krakow Branch, Poland)

Session Classification: Poster session