Our Contribution to the EuroSafe Imaging Call of Action EUSOBI - European Society of Breast Imaging

Safe breast imaging
for saving women’s lives

1. Screen-film mammography (SFM) should be completely replaced by digital mammography (DM), which yields higher diagnostic accuracy using lower radiation doses

Randomised controlled trials have shown that screening mammography reduces breast cancer mortality, mainly through its ability to depict subtle masses and microcalcifications that may represent early breast cancer [1]. While early studies were performed using SFM, DM has been used since the early 2000s. Studies comparing SFM with DM demonstrated similar diagnostic accuracy in the overall screening population and significantly better results for DM in women younger than 50 years, pre or peri-menopausal and with mammographically dense breasts (Figure 1) [2]. According to guidelines, the dose limit per view for mammography is 3 mGy [3]. When screening mammography is performed within this dose, the risk of radiation-induced breast cancer is small, compared to the expected mortality reduction achievable [4]. A considerable decrease in the average glandular dose (~20%), is achieved with DM when compared to SFM [5]. All these data are strongly in favour of the use of DM in screening [6]. A recent tomographic technology, digital breast tomosynthesis (DBT), seems to be able to achieve higher detection rates and a lower recall rate in the screening setting [7]. DBT gives a radiation dose slightly higher than that of DM (8), below regulations for mammography, and standard 2D mammograms can be obtained from DBT data sets [8].

2. Reducing or eliminating breast radiation exposure in high-risk women

It has been shown that exposure to radiation during screening mammography may have deleterious effects on women at high risk for breast cancer, such as BRCA mutation carriers [10]. Annual screening mammography reduces breast cancer mortality but at the same time requires repeated radiation exposure. Before the age of 35 years the disadvantages of regular screening mammography outweigh their advantages in high-risk patients [11]. The performance of mammography and other screening modalities in high-risk women has been the aim of several studies. The recent Ontario study showed that in 2,207 high-risk women none of the 35 cancer types were detected by mammogram alone but either by magnetic resonance imaging (MRI) alone or by MRI and mammography [12]. In another study MRI was the single modality with the highest sensitivity for cancer detection (99%) compared to other modalities. MRI together with mammography or ultrasound (US) had the highest overall sensitivity (98%). Only one carcinoma was diagnosed by mammography and ultrasound but not by MRI [13]. MRI has the highest sensitivity as a single screening modality in high-risk women (Fig. 2).

3. Good clinical use of US and MRI in breast imaging

Mammography shows limitations, both in lesion detection and characterisation, and has a lower sensitivity in women with dense breasts. Ultrasound has a significant added value in the further evaluation of mammographic findings and symptomatic women. Using US, radiologists can immediately distinguish solid from cystic lesions, a frequent cause of palpable lumps [14]. When a suspicious lesion is detected, ultrasound-guided percutaneous aspiration or biopsy can easily be performed with a very high diagnostic accuracy, and without relevant complications [15]. The technique that, at present time, has the highest sensitivity in the diagnosis of breast cancer is magnetic resonance imaging (MRI) [16]. As recommended by international guidelines, MRI is helpful in many clinical scenarios such as equivocal findings in conventional imaging (Fig. 3), screening of high-risk women. When used in local staging of women with newly diagnosed breast cancer, in specific settings, it can help a multidisciplinary therapeutic team to validate or change the treatment already planned with mammography and ultrasound imaging [17]. The measures described above to implement the ALARA principle in breast imaging detail some of the many approaches enforced by the EUSOBI and illustrate EUSOBI’s efforts to contribute to the EuroSafe Imaging call for action.

References