

Opinion Article / Artigo de Opinião

The Breast Radiology in Senology

A Radiologia Mamária na Senologia

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In the last decade, technological advances and scientific knowledge about breast cancer have had a huge impact on all the subspecialties that make up the breast centers. In particular, Radiology has established itself as a central element in the multidisciplinary approach to breast pathology, intervening in all stages of breast cancer, including screening, diagnosis, staging and post-treatment follow-up.

This performance of Mammary Radiology was well reflected in the recent SPRMN conferences, dedicated to breast centers.

Using criteria for breast cancer mammographic screening based only on sex and age, as it has been so far the case, seems scarce in the light of current knowledge. It is important to identify high-risk groups that require different screening as well as factors that may increase cancer risk and decrease screening sensitivity, such as breast density. If for the high-risk groups of breast carcinoma, which include women with a heavy family history, a proven genetic mutation, or a history of treatment in the childhood with radiotherapy due to Hodgkin's lymphoma, there is consensus about the type of screening that should be done – annual breast MRI around the age of 25 - the same does not occur in the groups with high breast density (BI-RADS ACR-c and d), who represent about 40% of women at a traceable age. There is no established consensus as to the most appropriate complementary method to be used in the referred breast density patterns, namely ultrasound, MRI or tomosynthesis. Of these alternatives, since ultrasound is a labor-intensive and time-consuming examination and MRI is difficult to perform in such a large number of women, the advantage lies in tomosynthesis, which represents a recent advance in digital mammography, allowing the breast to be "sliced" in planes which are 1 mm thick.

Tomosynthesis allowed the elimination of false positives resulting from the overlapping of breast tissue and reduce false negatives by increasing the rate of detection of breast cancer in all mammary patterns, especially in the most heterogeneous and dense. The impact of tomosynthesis was so significant that its implementation was much faster than that of direct digital mammography. Its approval by the Food and Drug Administration (FDA) occurred in 2011 and today no one thinks of acquiring mammography equipment without tomosynthesis. There are several population screening programs under way with this technique, demonstrating exceptional results that reflect the significant increase in detection rate, as well as the reduction of false positives and consequently the reduction of the gauging rate.

On the other hand, the technological advance that allowed a synthesized 2D image from tomosynthesis, identical to the image of conventional mammography, with the same quality and without increasing radiation, also allowed an important dose reduction per examination. The synthesized 2D image constituted, therefore, a crucial stage in the process of tomosynthesis implementation.

MR is another indispensable modality in breast centers! In addition to its application in screening high-risk groups for breast cancer, the increased implementation in diagnostic settings has revealed high sensitivity and specificity, reflected in the amount of information provided when rigorous technical acquisition results in high quality examination.

One of the indications for breast MRI that has shown increasing adherence is the newly diagnosed breast cancer staging. Despite the discussion surrounding the topic, MRI has become a method that plays a pivotal role in surgical planning. The increased accuracy of MRI in the assessment of tumor extension and in the identification of in situ carcinoma component (CDIS) associated without mammographic translation, even in adipose patterns, has contributed to this performance. In addition, the rate of detection of multifocality and, to a lesser extent, bilaterality, as well as the evaluation of the ganglion chains.

The knowledge of the heterogeneity of breast cancer has added further indications for breast MRI at staging, namely in the molecular subtypes that are most frequently associated with multifocality, such as Her2 positive and luminal B tumors.

The number of situations with indication for neoadjuvant therapy has increased as a result of the advances in medical oncology with new and different therapeutic options, such as new antibodies for Her2 positive tumors. It also increases the rate of complete pathological responses obtained with neoadjuvant therapy, especially in triple negative, Her2 positive tumors and in tumors with high proliferative indexes (Ki67).

Current medicine is increasingly individualized and therapy is planned in a multidisciplinary environment based on the complete knowledge of the patient's characteristics and neoplasia. It is as important to know the molecular subtype of the lesion as to know if it is single or multiple, its extent and degree of involvement of the ganglion chains. Much of the information necessary for the complete picture of the neoplasm is provided by imaging techniques: mammography and tomosynthesis, ultrasound, and, especially, breast MRI.

Diagnosis of breast lesions using percutaneous biopsy techniques, guided by imaging methods, has been the common practice since the early 1990s and there is currently no room for surgical biopsy. Any surgery should be preceded by percutaneous diagnosis, since these are techniques of high precision and high concordance rate with the final histological diagnosis. This is why, in view of microcalcifications suspected of malignancy, it is mandatory that the biopsy be performed using a vacuum technique (BAV) in order to obtain a representative sample of the lesion, with a lower risk of disagreement with the final histology.

The advancement of biopsy techniques, the increased user experience and the greater knowledge about lesions of uncertain malignant potential or B3 lesions and their upgrading risk, have led to the increasing use of BAV not only for diagnostic purposes but also therapeutic ones. The current recommendations in B3 lesions, such as flat epithelial atypia, classic lobular neoplasia, papillary lesions and in the radiological scar are for the excision of these lesions by BAV and non-surgical, followed by imaging surveillance during 5 years.

In cases in where BAV reveals the diagnosis of CDIS, it is known that treatment may fail, with development of invasive carcinoma in 15 to 20% of the cases, and on the other hand there is a large proportion of treated patients that does not relapse during their life. These facts have reinforced the role of breast MRI in pre-surgical assessment of CDIS as a more sensitive and adequate technique for the evaluation of extension when compared to mammography, particularly in clinically significant tumors: major and of high

grade. They also raised the controversy of overtreatment, motivating international clinical trials to identify criteria that determine the progression to higher-grade CDIS and/or invasive carcinoma and, potentially, provide models based on the evidence of active surveillance as a future option of approach on low risk patients.

One area that is likely to change over the next few years is the follow-up after therapy. At present almost all international recommendations refer only to annual mammography. We know that there are subtypes that associate with a higher probability of early relapse, that there are dense patterns and surgical procedures that make it difficult to detect early the relapse with mammography. It is already possible to identify groups where the risk of relapse is greater and the follow-up should include MRI.

From the systemic point of view, the increasing importance attributed to the diagnosis of oligometastatic disease, due to the existing therapeutic options and with an apparent impact on survival, will also lead to a change in surveillance recommendations for the early detection of recurrence at a distance.

The challenges that Mammary Radiology poses to Medical Radiologists require dedication and knowledge that extend beyond the scope of Radiology. The scientific quality of the recent Conference, resulting from the sub-specialization of the participants and their integration in a multidisciplinary environment, was aimed at motivating and alerting the audience to the need and importance of the sub-specialization in Mammary Radiology.