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THE CORRELATION BETWEEN ULTRASSONOGRAFIC PREDICTORS, LOBAR ANATOMY AND TUMOR BIOLOGY

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Introduction: Since the 90s, breast ultrasound (US) features that predict malignancy or benignity are well established, but recently Stravos and Taboul et al. brought new concepts that set out to understand lobar anatomy and its relationship with breast lesions. Nowadays we seek to understand the relationship between breast anatomy and imaging to differentiate malignant from benign lesions and to predict their biological behavior. **Objectives:** To correlate breast lesions morphology and tumor biology with BIRADS® ultrasound predictors. **Methods:** This study was performed from 2012 to 2017. A total of 1,070 breast lesions underwent US examination and anatomopathological study. Collected data included patients' age, tumor size, presence or absence of echogenic halo and ultrasound predictors of BIRADS® 5th edition (shape, margin, surrounding tissue, presence of calcifications, echogenicity, posterior acoustic effect, lesion borders, orientation and doppler). Patients ≥18 years old with benign lesions and breast carcinomas were included. **Results:** When a lesion grows affronting lobar anatomy in a non-parallel manner, a malignant process is suspected. The risk of malignancy for this predictor was 7.92-times higher. Benign lesions do not infiltrate adjacent tissue, resulting in a circumscribed margin. Breast carcinomas grow infiltratively creating tissue reactions. Thus, when margins are infiltrative, there is a greater risk of malignancy – spiculated (61.4 times), angulated (24.4 times), microlobulated (9.4 times), indistinct (6.8 times). The presence of halo increased the risk by 25.3 times and thickening of the surrounding tissue by 6.7 times. In carcinomas, irregular shape is the most prevalent. But in fast growing lesions, round shape can also be found. We found a 6.27-fold increased risk in irregular tumors and 1.86-fold in round ones. Carcinomas with a large fibrous component generate posterior acoustic shadowing, a finding linked to cancer. We found a 2.56-fold increased risk. Acoustic enhancement was also observed in high cellularity tumors, such as triple negative. In our series, the risk of malignancy was 8.1 times higher. Ultrasound also contribute to the study of calcifications. Its presence within the nodule increased the risk by 3.55 times for malignancy. Heterogeneous lesions in this study showed a 5.1-fold risk. Angiogenesis is important in differentiating benign and malignant lesions, using doppler to assess this. Lesions with inner flow increased the risk by 5.39 times. **Conclusions:** Breast imaging, mainly with radiogenomics and radiomics development, is used to assess predictors of malignancy and benignity from a new perspective. It is important to understand the reason of a particular phenotype and its biological implications. In this context, the present study shows new data and brings a reflection on the reason for each finding, adapting the interpretation of US predictors to a new era of breast imaging.