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# ANALYSIS OF BREAST NODULE VASCULARITY AS A PREDICTIVE FACTOR FOR MALIGNANCY

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**Introduction:** Ultrasound is considered the main complementary diagnostic method to mammography in screening malignant breast nodules. The fifth edition of the BI-RADS<sup>®</sup> classification suggests analyzing nodule vascularity and the resistance index (RI) during the ultrasound. However, they are still not considered a decisive factor for the final classification. **Objectives:** To evaluate if the vascularity of breast nodules is a predictive factor for malignancy, and identify the RI value of the vessel most associated with malignant results. **Methodology:** This retrospective cross-sectional study assessed 750 ultrasound-guided breast biopsies performed at the Mastology Outpatient Clinic of the Hospital das Clínicas da Faculdade de Medicina de Ribeirão Preto da Universidade de São Paulo (HCFMRP-USP) from August 2015 to May 2017. The variables analyzed included examination date, ultrasound BI-RADS<sup>®</sup> category, internal nodule vascularity, RI value, and biopsy result. Exams from patients with no breast nodule were excluded. The statistical analysis was performed using Pearson's  $X^2$  test. **Results:** The presence of vessels inside the nodule was highly associated with malignancy (OR=7.2,  $p<0.0001$ ) and also with BI-RADS<sup>®</sup> categories of greater risk ( $p<0.0001$ ). The median RI was 0.7 (interquartile range – IQR=0.23) in benign nodules with vessel and 0.86 (IQR=0.23) in malignant ones, with statistical significance ( $p<0.0001$ ). The RI cut-off point to predict malignancy was 0.71 with 83.8% accuracy, 91.9% sensitivity, and 57% specificity (according to the Receiver Operating Characteristic – ROC – curve). Nodules initially classified as 4A but with internal vascularity and high resistance (RI>0.71) proved to be malignant in the biopsy in 35.7% of cases, that is, much higher than expected for the category (2% to 10%). Similarly, 72% of nodules initially classified as 4B but with internal vascularity and high resistance were malignant. On the other hand, 18.4% of nodules classified as 4C but without internal vascularity had malignancy confirmed by biopsy, far below the expected for the category (50% to 95%). **Conclusion:** The presence of internal vascularity and the RI were important factors for differentiating benign nodules from malignant ones on ultrasound, and in images classified as BI-RADS<sup>®</sup> 4, this information can be essential when dividing these nodules into subcategories (4A, 4B, and 4C).