ANALYSIS OF SPICULES USING DIGITAL BREAST TOMOSYNTHESIS IN BENIGN AND MALIGNANT SPICULATED BREAST MASSES

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Problem Statement: Many published clinical studies worldwide concluded that Digital breast tomosynthesis improves detection and characterization of breast lesions. The purpose of this study was to investigate whether this improvement in characterization of spicules can contribute to better differentiation between benign and malignant spiculated breast masses, to avoid unnecessary breast biopsies.

Methods: We analyzed all spiculated breast masses that were diagnosed and affirmed by a pathologist in our hospital from May 2015 till March 2016. In this period there were in total 66 masses (51 malignant and 15 benign), that were presented in women between 29 and 87 years of age. All breast examinations were performed on Hologic Digital breast tomosynthesis system Selenia Dimensions 3D. Following characteristics of spicules were analyzed: number (<5, 5-20, >20), how much of volume is spiculated (part, whole), density (hipo or iso-hyper in correlation with mass density), average width at the base (thin, medium, thick), tapering from base to top (yes, no) and length (less or more in correlation with mass diameter).

Results: Malignant masses had high number of spicules in 49% of cases, whole volume of the mass was spiculated in 73%, spicules were iso-hyperdense in 45%, thick at the base in 13%, tapered from base to top in 37% and were shorter than mass diameter in 83%. Benign masses had high number of spicules in 40% of cases, whole volume of the mass was spiculated in 53%, spicules were iso-hyperdense in 33%, thick at the base in 7%, tapered from base to top in 13% and were shorter than mass diameter in 67%.

Conclusion: Our preliminary results suggest there are differences in characteristics of spicules between benign and malignant spiculated breast masses. Malignant breast masses, compared with benign, have higher number of spicules, more often whole volume of the mass is involved, more often spicules are iso-hyperdense, thicker at the base, more often taper from base to top and are shorter in correlation with mass diameter. Further testing is required to determine statistical significance of these differences what would, if the significance is present, result in less diagnostic biopsies, less expenses and less anxiety for the patients.

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