The potential role of cavity margins sampling shaving to predict complete tumor resection by vacuum-assisted excision

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Objective: The objective of this study was to evaluate the cavity margins sampling shaving (CMSH) as a predictor of complete tumor resection (CR) by VAE. **Methodology:** This is a retrospective database analysis of 120 ductal carcinoma *in situ* (DCIS) and invasive cancers (IC) of the breast, smaller than 20 mm (image), submitted to diagnostic VAE-CMSH and standard surgery (SS) from June 2021 to December 2023. VAE definition: more than 12 core samples (CS) with 7G needle or 18 samples with 10G needle. CMSH definition: core sampling the round residual cavity circumference after VAE. CMSH-CS were allocated in an exclusive bottle and sent to the laboratory. Demographic, imaging, pathology, VAE, CMSH, and SS data were collected. CMSH was compared with SS (gold standard) to predict CR. The SPSS® 20.0 software was used for statistical analyses. **Results:** The mean age was 58.5 years; the mean imaging tumor size (iT) was 12.4 mm; masses were 68 (56.7%); the mean VAE-CS was 29.5 weighting 9.3 g; the mean CMSH-CS was 10.9 weighting 6.2 g; the mean final pathological tumor size (pT) is 7.5 mm. IC were 75 (62.5%) and DCIS 45 (37.5%); 46 (38.3%) were CR by VAE-CMSH and 74 (61.7%) were not. CMSH was negative for residual cancer in 52 (43.3%) and positive in 68 (56.7%). CMSH sensitivity (SENS) was 70.7%, specificity (ESP) was 66.7%, positive predictive value (PPV) was 77.9%, negative predictive value (NPV) was 57.7%, and false negative rate (FNR) was 29.3%. The variables significatively related to VAE-CMSH CR were the pathological tumor size in the CMSH (p=0.014) and pT (p=0.023); to true negative CMSH was pT (p=0.041); to false negative CMSH were calcifications (p=0.030); IC associated to DCIS (p<0.001) and the DCIS tumor size in the SS (p=0.016). For pure IC, CMSH SENS was 88.9%, ESP was 83.3%, PPV was 88.9%, NPV was 83.3% and FNR was 11.1%. **Conclusion:** CMSH may be a potential approach to predict CR by VAE. Potential selected criteria for future intention to CR trials comparing VAE-CMSH to SS should be small masses of pure IC without calcifications.

Keywords: breast neoplasms; image-guided biopsies; minimally invasive surgical procedures; vacuum-assisted excision..