Assessment of skin involvement in breast cancer: preoperative ultrasound and anatomopathological correlation

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Introduction: The removal of the skin overlying a tumor is often unnecessary and can compromise the aesthetic result of breast surgery. In the presence of a breast carcinoma, the distance between the lesion and skin is an important factor in the decision to remove or preserve the skin overlying the tumor.

Methods: The study included 39 patients with 41 tumors, previously diagnosed as primary invasive breast carcinomas, candidates for conservative or radical surgery (mastectomy). Distance measurements between the tumor and skin were performed using preoperative ultrasound and an anatomopathological evaluation. All patients underwent surgery, which invariably included removal of the skin overlying the tumor, as previously marked. A relationship between the distance observed in US examinations and anatomopathological specimen was established.

Results: The mean distance between the tumor and skin obtained from the US examinations was 0.8 cm, with a minimum of 0.15 cm and a maximum of 2.43 cm. The Path examinations yielded a mean distance of 2.21 cm, with values ranging from 0.5 to 5.0 cm. The Pearson correlation coefficient between the methods was $r = 0.75$.

Conclusion: The distance obtained by sonography was consistently less than that obtained from a pathology specimen, and the average difference was 3.1-fold. The Path distance between the tumor and skin can be estimated using the following model: $D_{Pathology} = 0.69 + 1.89 \times D_{US}$, where $D$ is distance.

Figure 1 - Correlation between the tumor-skin distances obtained from US (A) and Path examinations (B). The distance obtained from the Path examinations was based on the use of tattoo ink as a reference, which was applied during preoperative US (C).

Figure 2: Bland-Altman plots showing the difference between observers for US (A) and Path measurements (B). Note the very small mean difference between observers for both methods (-0.03 for US and -0.04 for pathology).

Figure 3: Scatter plot for the mean US and Path measurements. The estimated model is given by the following: $D_{Pathology} = 0.69 + 1.89 \times D_{US}$.