Comparative Planning Study of Different Tumor Bed Localization Modalities after Onco-plastic Conservative Surgery for Early Stage Breast Cancer

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Purpose/objectives

To compare modalities of tumor bed localization for target volume delineation after onco-plastic breast surgery i.e. clinically, CT-guided, US-guided & surgical clips-guided delineation.

Methods/materials

Twenty seven patients who underwent onco-plastic BCS with surgical clips insertion (at least 3 clips) were included. CT & US imaging for tumor bed localization were done 3-4 weeks postoperatively in the same treatment position. Tumor bed was delineated four times; using surgical clips, clinical data, CT (seroma based) & US based.

Results

**Tumor bed volumes** were compared for the 4 modalities; with median values of 60.7 cm³ for clinical vs 60.8 cm³ for CT vs 49.3 cm³ for US in comparison to 59.7 cm³ for clips (P value=0.05). Median values for **GMI** (Geographical miss index, representing the tissue within the tumor bed at high risk of local recurrence which would not have been treated in the boost field if the experimental test was used), were 61.8% for clinical vs 45% for CT vs 62.4% for US when each was compared to surgical clips, with a significant difference (P value=0.029).

**Overlap index** (compared to clips-guided tumor bed) for clinical method was 0.36 vs 0.42 for CT vs 0.35 for US with a statistically significant difference (P value=0.041).

In the superior-inferior direction, the median shift was 0.72 cm for clinical vs -0.03 cm for CT vs -0.2 cm for US (P value=0.024). In the anterior-posterior direction, the median shift was -0.07 cm for clinical vs -0.15 cm for CT vs -0.09 cm for US (P value=0.455). In the medio-lateral direction, the median shift was 0.4 cm for clinical vs -0.13 cm for CT vs 0.09 cm for US (P value=0.607).

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<th>Clinical</th>
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<tbody>
<tr>
<td>X</td>
<td>Median</td>
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<tr>
<td>Y</td>
<td>-0.07</td>
<td>-3.10-3.50</td>
<td>-0.15</td>
<td>-2.80-2.80</td>
<td>-0.09</td>
<td>-2.43-1.9</td>
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<tr>
<td>Z</td>
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<td>-3.07-6.20</td>
<td>-0.03</td>
<td>-3.20-1.97</td>
<td>-0.2</td>
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**Conclusions**

- Significant differences in shifts & indices were detected between clinical, seroma or US boost localization when compared to surgical clips modality. Thus, in the setting of onco-plastic breast surgery, surgical clips should be routinely used for tumor bed localization.
- In view of the larger volumes of breast tissue excised & the extensive remodeling that are inherent to many onco-plastic procedures, the concept of tumor bed boost irradiation should be re-challenged in that setting.

**References**