Pre-surgical Biophysical Lymphedema Assessments of Patients with Breast Cancer

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Introduction: Early detection of breast cancer treatment-related lymphedema (BCRL) may prompt early lymphedema-treatment that potentially optimizes therapeutic outcomes. Pre-surgical evaluations of patients followed by periodic follow-ups is the best approach, but pre-surgical assessments are often not done for a variety of reasons with patients being seen for the first time sometime after surgery. Because BCRL is most often unilateral, it would thus be useful to know if breast cancer presence alters side-to-side values of assessment parameters that are subsequently used to detect post-surgical/radiation related lymphedema.
Methods: Both arms of 30 newly diagnosed breast cancer patients were evaluated within two weeks of their subsequent surgery using bioimpedance[1] and arm volume determinations. Also, local tissue water was determined bilaterally using tissue dielectric constant[2] (TDC) values at the forearm, biceps, axilla and lateral thorax. These sites all often show early lymphedematous changes.
Results: Absolute values are given as mean±SD for affected (A) and contralateral (C) body sides in that order with A/C ratios in parenthesis. *Arm volumes*: 2211±614 vs. 2211±556 ml (0.995), *Arm bioimpedance*: 303.8±33.5 vs. 304.5±34.2 (0.999), $TDC_{forearm}$: 25.8±3.0 vs. 25.2±3.2 (1.03), TDC_{biceps}: 22.4±2.9 vs. 22.2±2.9 (1.01), TDC_{thorax}: 25.2±5.1 vs. 24.6±4.8 (1.03),TDC_{axilla}: 34.3±8.1 vs. 33.3±8.8 (1.05). All differences between sides were statistically insignificant $p>0.4$.
Conclusion: Similarity of side-to-side values in all parameters suggests that when it is not possible to obtain pre-surgery measurements, subsequent differentials between sides that exceed established thresholds may still be useful for diagnostic purposes.
References:
1. Cornish BH et al. Lymphology, 2001;34:2-11.
2. Mayrovitz HN Lymphology, 2007;40: 87-94.