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ASSESSING LOCAL TISSUE EDEMA IN POSTMASTECTOMY LYMPHEDEMA

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ABSTRACT

Overall limb lymphedema can be assessed by several methods but none are suitable to determine local edema. Quantifying local edema could provide important information not previously available. Our goal was to determine the suitability of using the tissue dielectric constant (TDC) as and index of local tissue water to detect and quantify edema in postmastectomy patients with unilateral arm lymphedema. Segmental arm volume and TDC were measured in both arms of 18 women with unilateral lymphedema, and in 15 premenopausal and 15 postmenopausal controls. TDC was measured at a frequency of 300 MHz using open-ended coaxial probes with effective measuring depths of 0.5, 1.5, 2.5 and 5.0 mm. For patients and controls, absolute TDC depended on measurement depth but for any depth the TDC of lymphedematous segments was significantly greater than for non-affected contralateral arms ($p<0.001$). At a depth of 2.5 mm, the TDC ratio between arms for patients was 1.64±0.30 vs.1.04±0.04 for both control groups ($p<0.001$). No patient's TDC ratio was as low as 1.2 and no control subject's TDC ratio was as great as 1.2. Results suggest that this method is a good quantitative discriminator of the presence of lymphedema in patients with unilateral limb lymphedema.