

Does Measurement Site Impact Lower Extremity Edema Assessment When Evaluated Using Tissue Dielectric Constant Values?

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Abstract

Background:

Lower extremity edema/lymphedema is the abnormal accumulation of interstitial fluid due to various etiologies. Quantification and tracking of changes are clinically useful. A novel method uses tissue dielectric constant (TDC) measurements to assess local tissue fluid by touching the skin for a few seconds. A previous study indicated that a leg/forearm TDC ratio (1.35) is a threshold for a lower extremity edema. This study's goal was to compare outcome differences when measuring medial vs. lateral leg sites for this diagnosis.

Methods:

Twelve women with a confirmed diagnosis of lower extremity edema/lymphedema were evaluated after signing an IRB approved consent. Triplicate TDC values were measured eight cm proximal to the medial malleolus of the most edematous leg on both medial and lateral sides. A site on the ipsilateral forearm was measured as a reference. Differences between medial and lateral absolute values and leg-to-arm ratios were evaluated using Wilcoxon signed-rank test with p-value <0.05 being accepted as statistically significant.

Results:

The group mean age was 76.8±12.4 years with a BMI of 31.1±10.1 kg/m². TDC values at the medial and lateral sites were not statistically different (61.8±10.4 vs. 55.8±12.6, p = 0.595). TDC leg-to-arm ratios at the medial and lateral sites were not statistically different (1.843±0.299 vs. 1.732±0.249, p = 0.585).

Discussion:

TDC is a unique way to rapidly evaluate localized edema/lymphedema. Present results indicate measurements at either medial or lateral leg sites yield clinical assessments with similar outcomes. This indicates the method can offer rapid quantitative assessments of lower extremity edema/lymphedema.

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