Ultrasound Tissue Characterization of Breast Biopsy Specimens: Expanded Study

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Mortensen C.L. [1]; Edmonds P.D. [1]; Gorfu Y. [1]; Hill J.R. [2]; Jensen J.F. [1]; Schattner P. [1]; Shifrin L.A. [1]; Valdes A.D. [3]; Jeffrey S.S. [4]; Esserman L.J. [4]

[1] Bioengineering Research, SRI International, Menlo Park, California, 94025
[2] Toxicology, SRI International, Menlo Park, California, 94025
[3] Electromagnetic Sciences Laboratories, SRI International, Menlo Park, California, 94025
[4] Department of Surgery, Stanford University School of Medicine, Stanford, California, 94305

Abstract:

Tissue classification by examining sets of ultrasound parameters is an elusive goal. We report analysis of measurements of ultrasound speed, attenuation and backscatter in the range 3 to 8 MHz in breast tissues at 37 C. Statistical discriminant analysis and neural net analysis were employed. Data were acquired from 24 biopsy and 7 mastectomy specimens. Best separation of the classes normal, benign, and malignant occurred in the 18 cases where two tissue classes were present in the same specimen and parameters were corrected for within-patient mean; then 85-90% of cases in test sets were correctly classified. Most errors comprised misclassified benign cases. The neural net was comparable to discriminant analysis and slightly superior in separating normal and malignant classes.

Keywords: Attenuation; backscatter; breast tissues; discriminant analysis; artificial neural network; sound speed; ultrasound tissue characterization

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