Medical Physics Seminar
Monday, April 20th, 2015
1335 HSLC ~ 4:00 P.M.

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Characterization of Carotid Plaque Vulnerability Using Quantitative Ultrasound and Strain Imaging

Stroke is the leading cause of serious, long-term disability and the third leading cause of death in the United States. In addition to clinically recognized stroke, "silent" strokes may occur, and are five times more prevalent. Silent strokes are not detected based on classical transient ischemic attack (TIA) symptoms and therefore difficult to prevent. It is likely that these "silent" strokes may be causing accumulated cognitive decline. Cerebral micro-emboli due to instability in carotid vulnerable plaque can lead to cognitive impairment. Thus it is important to characterize carotid plaque and assess its vulnerability.

Plaque instability may be characterized by increased strain variations over a cardiac cycle with arterial pulsation. Therefore, strain imaging to detect plaque vulnerability based on regions with large strain fluctuations, may be able to determine risk of plaque rupture, which can lead to cognitive impairment. Thus ultrasound strain imaging may be a useful surrogate in the clinic to detect vulnerability of plaque and assess potential risk of silent stroke.

Carotid plaque can also be characterized by quantitative ultrasound (QUS), since QUS can assess acoustic properties of tissue. Carotid plaque is primarily composed of cholesterol, calcium, and fibrous tissue. Differences in acoustic properties may reflect difference in tissue composition. Histology is the gold standard in tissue identification. The accuracy of QUS characterization could be estimated by comparing it to histology.

1335 HEALTH SCIENCES LEARNING CENTER 4:00 TO 5:00 P.M.