

Using shear wave elastography to manage breast cancer patients

Shearwave elastography (SWE) is used in the clinic to decide which breast masses require biopsy and which do not. This is because most fibroadenomas are soft (mean $<50\text{kPa}$) and 95% of cancer are stiff. The stiffness of cancers are related to a number of biologically important prognostic factors such as size, histological grade and vascular invasion. In addition stiffness at SWE is an independent predictor of nodal metastasis even when known predictors of nodal metastasis have been taken into account.

Stiffness has also been shown by a number of studies to be related to resistance to chemotherapy. A recent study has also shown that stiffness of cancer at SWE is an independent predictor of breast cancer specific mortality. Stiffness on SWE should therefore be taken into account when deciding if a neoadjuvant chemotherapy is appropriate.

Changes in stiffness in cancers being treated with neoadjuvant chemotherapy have recently been shown to be highly predictive of eventual response. Ultrasound combined with SWE may therefore provide a faster, cheaper and more convenient method of monitoring such patients compared to MRI which is used currently.