Elastography

Determining the mechanical properties of brain tissues is essential in the field of brain biomechanics. Liu et al., use ultrasound-based shear wave elastography to measure both in vivo and ex vivo elastic properties of brain tissues.

Elastography is a medical imaging modality that maps the elastic properties of soft tissue. The main idea is that whether the tissue is hard or soft will give diagnostic information about the presence or status of disease. For example, cancerous tumours will often be harder than the surrounding tissue, and diseased livers are stiffer than healthy ones.

Elastography is a relatively new technology, and entered the clinic primarily in the last decade. The most prominent techniques use ultrasound or magnetic resonance imaging (MRI) to make both the stiffness map and an anatomical image for comparison.

see Magnetic resonance elastography.

Results demonstrate that the shear modulus from in vivo measurements is about 47% higher than that given by the ex vivo measurements (p value = 0.0063). The change in ex vivo elastic properties within 60-min post-mortem is negligible. The results also show that within 60-min post-mortem and in a temperature range of 37-23 °C, the elastic properties of brain tissues approximately linearly depend on the temperature in both cooling and re-heating processes [1].

1)
Liu YL, Liu D, Xu L, Su C, Li GY, Qian LX, Cao Y. In vivo and ex vivo elastic properties of brain tissues measured with ultrasound elastography. J Mech Behav Biomed Mater. 2018 Apr 19;83:120-125. doi: 10.1016/j.jmbbm.2018.04.017. [Epub ahead of print] PubMed PMID: 29702328.