

AbstractID: 2315 Title: Non-invasive Surgery Using High Intensity Focused Ultrasound (HIFU)

More recently there are profound changes in the way surgical procedures are performed. Non-invasive or minimally invasive surgical procedures are being performed under image guidance to reduce cost and discomfort associated with standard surgical procedures. The high intensity focused ultrasound (HIFU) or sometimes known as Focused Ultrasound Surgery (FUS) is playing a significant role as a non-invasive technology from sealing the bleeding wound to treatment of malignant cancers and other tumors. The HIFU technology was explored in the late 40's, however, it has recently gained tremendous momentum as other imaging modality such as MRI and ultrasound have become available to plan the treatment and guide the HIFU beam in the area of interest. Generally, HIFU is produced using a large aperture transducer to produce ultrasound peak intensities of 500 to 2000 watts/cm² in the focal zone. The targeted tissues are exposed to high intensities for several seconds (from 3 to 10) that raises tissue temperatures to 80-90 degree C resulting in denature of the protein and coagulative necrosis of tissue in the focal zone while keeping the intervening tissue temperature at physiological safe levels. The ultrasound beam steered and the procedure is repeated several times to treat the entire tumor tissue volume. Generally, the HIFU procedure is guided and monitored using the diagnostic imaging systems such as ultrasound or MRI. The HIFU surgery is bloodless resulting minimal complications and carried out as an outpatient procedure. The HIFU is used in Europe, China and Japan on a routine basis while undergoing several clinical trials under the FDA approved protocols.

Educational Objectives:

1. Basic Understanding on High Intensity Focus Ultrasound (HIFU)
2. Review of HIFU applications for the treatment of both benign and malignant tissue.