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## THE ULTRASOUND JOURNAL OF HEALTH CARE

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#### **EDITORIAL - I**

The ability of ultrasound energy to interact with biological tissues has L been recognized for many years. The use of ultrasound in today's clinical practice is mostly diagnostic though earliest medical uses of ultrasound waves were therapeutic. The ability of ultrasound energy to cause a rise in tissue temperature was recognized as long ago as 1927. Limitations of accuracy and temperature monitoring hampered clinical development of this technique. But with the recent introduction of modern image guidance the therapeutic use of ultrasound energy has become a reality. The feasibility of a MRI guided system was first described in 1995. High intensity ultrasound can be focused into a small volume to produce a rise in tissue temperature sufficient to cause lethal eell damage to the target at depth within the body. Concurrent MRI allows accurate tissue targeting and thus achieving controlled and localised thermal ablation without damaging the surrounding healthy tissues. Actually using this method complete areas within solid organs can be destroyed without damage to the skin barrier. Focused ultrasound is emerging as a completely non-invasive and obviously low-risk therapy for treating uterine fibroids. Historically treatment of uterine fibroids has been surgical, either Myomectomy or Hysterectomy. However in the last decade women are becoming reluctant to undergo open pelvic surgery hence treatment of uterine fibroids are changing from laparoscoptc myomectomy and hysterectomy to Mirena Intra uterine system and Uterine Artery Embolisation Later on Thermal ablation techniques emerged where first generation thermal ablation was delivered via the laparoscopic approach and second generation thermal ablation relied on MR (MR guided laser ablation) Latest in thermal ablation is MR guided Focused Ultrasound (MRgFUS). In this technique a specially designed patient bed containing a ultrasound transducer is used where the patient is positioned supine An ultrasound beam is generated from a phased array transducer. The beam travels through a gel pad and a water bath which help to create acoustic coupling. The ultrasound energy travels through tissues focusing at specific target within body like uterine fibroid. Within a short span of time tissue at focus reaches temperature sufficient enough to cause cell coagulation and thus undergoes necrosis but there is absolutely no damage to adjacent tissues. The type of necrosis here is coagulative rather than ischaemic process

so that *the painful* infarction syndrome that follows Uterine Artery Embolisation is avoided. Initially MRgFUS was designed for small sized fibroids but after patients safety is ensured the FDA expanded the allowable treatment volume. The Continued Access Study found better patients' satisfaction with expanded treatment guidelines (84.6% at 24 months post-treatment). Moreover MRgFUS holds special attraction for women in childbearing age group with uterine fibroids who wish to preserve their fertility

There are recent trials going on with pre-treatment of adjuvant GnRH analogue which extend the use of MRgFUS in larger fibroids. Due to accuracy and precision of the MRgFUS its use in recent future can be extended to treat Adenomyosis (Benign invasion of endometrium into myometrium) without any destruction on the surrounding myometnum

Though MRgFUS treatment of uterine fibroids has been found to be a safe treatment option as evidenced by phase I, II and III clinical trials further experience with this technique is needed to select patients effectively.

Dr. A. K. Roy