

An Alternative Treatment for Uterine Fibroids and Adenomyosis: High-intensity Focused Ultrasound

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Abstract

Uterine fibroids and adenomyosis are benign tumors commonly seen in gynecology clinics, more than cancers of the cervix or uterine cancers. Surgical methods for adenomyosis are often unsatisfactory, difficult, and not reproducible. Ultrasound (US)-guided high-intensity focused ultrasound (HIFU) (US-guided HIFU) adds another dimension to surgery for the treatment of fibroids and adenomyosis. It offers patients an alternative choice to be treated. US-guided HIFU revolutionizes the art of surgery and is a new disruption in the world of medicine.

Keywords: Adenomyosis, fibroids, high-intensity focused ultrasound, minimally invasive surgery, noninvasive surgery, ultrasound-guided high-intensity focused ultrasound

WEARING A CONDOM AFTER UNPROTECTED SEX

Recently, due to a high-profile case of undiagnosed leiomyosarcoma, the power morcellator was blamed to be the cause of upstaging the cancer.

In my opinion, it is unfair because the moment the knife prises open the uterus, the cancer would have spread and upstaged.

Then, gynecologists were advised to morcellate the tissues in a bag. This does not downstage the cancer. The only advantage that the fibroid fragments are collected in the bag is that it is easy for removal and good for accountability. However, it is a tedious intra-abdominal gymnastic exercise for the surgeons.

To avoid fragmentation, all one has to do is to use a larger bore diameter morcellator, for example, >20 mm size, and the fibroid tissues could come out in chunks and not fragments.

Hence, the use of the bag as one prominent professor from Mumbai described it like “wearing a condom after unprotected sex.”

Any fibroid, suspicious of cancer myomectomy, should not be done.

ADENOMYOSIS

There are so many classifications and surgical methods for adenomyosis, but none are satisfactory.^[1-3] Surgeries are often difficult and not reproducible except for certain skillful gynecologists and surgical teams. The uterus often ends up like a uterine “Frankenstein” with weak surgical scars and adhesions complicating healing and fertility.

High-intensity focused ultrasound (HIFU) uses about 800 times the diagnostic ultrasound (US) power, which converges at a focal point to deliver energy above 60°C, resulting in cell death by means of coagulation necrosis and

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cavitation destruction. Hence, HIFU is a virtual knife and has little or no collateral damage to the surrounding organs.

HIFU is a good alternative to avoid incisions to the uterus, especially in young reproductive women by avoiding adhesions and uterine rupture in pregnancy.

FROM MINIMALLY INVASIVE SURGERY TO NONINVASIVE SURGERY, HIGH-INTENSITY FOCUSED ULTRASOUND IS REVOLUTIONARY AND DISRUPTIVE

HIFU paves the way for minimally invasive surgery (MIS) to noninvasive surgery, in my personal experience.

My article on the use of HIFU for the treatment of uterine fibroids and adenomyosis will document the turning point in my career as a surgeon trained in open and MIS, to that of a HIFU surgeon.

A transformation of using a blood-stained knife to a bloodless virtual knife is a pinnacle in surgery. HIFU will be disruptive and revolutionary to gynecology.

My initial skepticism of HIFU, changing to that of a believer, then becoming a follower. All these, after an in-depth study and handling of HIFU, the virtual knife and learning the art of HIFU.

The first reason that struck me was that it was a very different machine than the one I knew before. This is a US-guided HIFU and not a magnetic resonance image (MRI)-guided HIFU. The technology is similar using high-intensity US energy, but the mode of delivery and the operator is different. In MRI-guided HIFU, the operator is often a radiologist, but in US-guided HIFU, the operator is the gynecologist or surgeon. Real-time US scanning is employed during the whole HIFU process.

The second reason that impressed me was the high-level systems and features built into the machine to ensure the safety and avoidance of complications.^[4-6]

I am talking about the ChongQing HIFU machine which I use. The safety protocol involves home preparation a week before HIFU, the preoperation preparation in the hospital, the nursing care during HIFU, and the postoperation recovery period. All these help to minimize complications many times over compared to conventional surgery. Its smart systems give it a better ablation effectiveness and better results compared to MRI-guided HIFU.^[7]

The third point and perhaps the most important is that patient recovery is fast and hospitalization is usually 1 day because there are no skin incisions. Downtime is just a few days to a week. Hospitalization cost is much lower, and hospital beds can be freed for other needy patients.

Colleagues, for example, the maternal-fetal specialists who are not comfortable or not trained in conventional surgeries, may now have a chance to perform noninvasive surgeries. Surgeons who are unable to stand for long hours on their feet can now be in HIFU surgery sitting comfortably in front of the console table.

ChongQing HAIFU Hospital does not rest on its laurels. It continues in its research to improve energy delivery, safety, and real-time imaging.

There are preceptorship programs to suit the learning gynecologists.^[8] This preceptorship training can even be continued after the acquisition of the machine to an overseas site.

Many research and scientific papers have been written on the US-guided HIFU. About 120,000 patients have been treated by US-guided HIFU at the end of 2018 compared to about 4000 cases worldwide by MRI-guided HIFU. HIFU is effective for ablation or reduction of fibroids and adenomyosis.^[9,10] Results have been reportedly good by many centers. Complication rates were low. Pregnancies were achieved with no HIFU-related side effects. In July 2019, NICE of the UK accepted US-guided HIFU as an alternative for the treatment of uterine fibroids and uterine adenomyosis.

US-guided HIFU adds another dimension to surgery for the treatment of fibroids and adenomyosis. However, it will never replace conventional surgery. It offers patients an alternative choice to be treated. US-guided HIFU revolutionizes the art of surgery and is a new disruption in the world of medicine.

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Conflicts of interest

The author declared that he used the Model JC USgHIFU from Chongqing HAIFU, China.

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