

## USE OF HIGH-INTENSITY FOCUSED ULTRASOUND (HIFU) IN TREATING UTERINE FIBROIDS: A CASE REPORT

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### **Summary**

Uterine fibroids are the most common benign uterine tumours in women of reproductive age. They can present with different symptoms, including menorrhagia, cramping lower abdominal pain, bloating, urinary/bowel symptoms, spotting, and infertility. Management could be medical and surgical. Other options include uterine artery embolization and non-invasive treatment with high-intensity focused ultrasound (HIFU). We present a case of a 32-year-old woman with menorrhagia and severe pelvic pain. Ultrasound examination revealed an intramural myoma measuring 93x98x87 mm. The patient signed informed consent for HIFU ablation of the fibroid. Three months after the procedure, an MRI scan showed the fibroid had shrunk to 75% of its original size with dimensions 32x35x29. After six months, she became pregnant and gave birth to a healthy infant at 38-weeks gestation with caesarean section, at which point the fibroid measured 2 cm. HIFU is an alternative to surgical therapies and is highly beneficial in women wishing for future pregnancies. Preserving the option for future pregnancies in patients with uterine fibroids is only one of its benefits and might be the key solution for these women. HIFU treatment of uterine fibroids is an innovative approach. It should be encouraged: it is widely adopted in similar cases where it has positively impacted the treatment of uterine fibroids.

**Keywords:** uterine fibroid, high intensity focused ultrasound, pregnancy

### **Introduction**

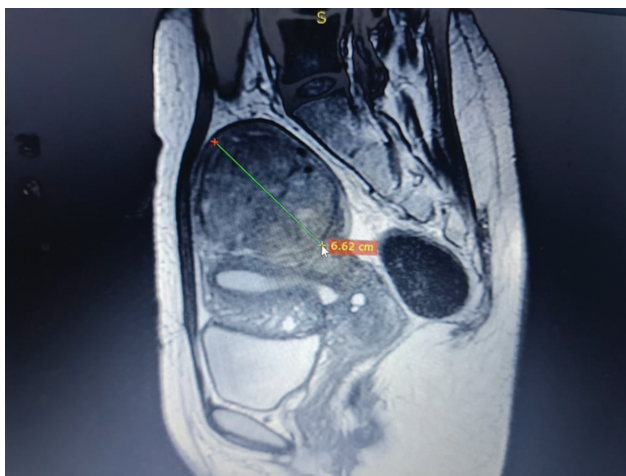
Uterine fibroids (UF) are the most common benign tumour of the female reproductive system. It mainly affects women in the age group of 30-50 years, but in some cases, it occurs at a younger age (20-35 years) [1]. Fibroids are often asymptomatic, but in some patients, they cause menstrual abnormalities - frequent and/or heavy bleeding, anaemia, constipation, frequent urination, pulling pain or heaviness in the abdomen, and infertility [2]. The treatment of fibroids is surgical (myomectomy, hysterectomy) and conservative (hormonal

treatment). New minimally invasive and non-invasive treatments have become popular, such as uterine artery embolization and high-intensity focused ultrasound (HIFU) [3].

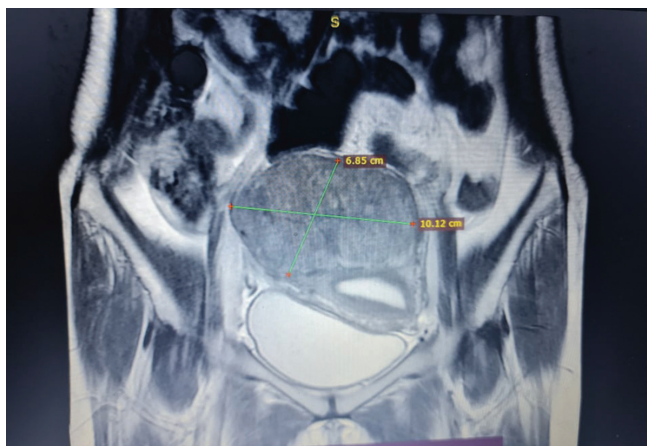
Abdominal ablation by HIFU is a non-invasive method of treatment that induces coagulation necrosis at the point where ultrasound rays

occur, and the process can be monitored by MRI or real-time diagnostic ultrasound.

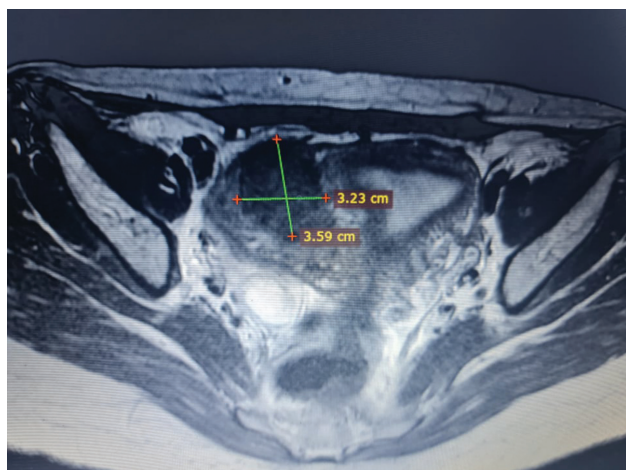
We present a case report of a 32-year-old woman with menorrhagia and severe pelvic pain for two years. MRI examination revealed an intramural myoma sized 68x100x66 mm (Figure 1 and 2).



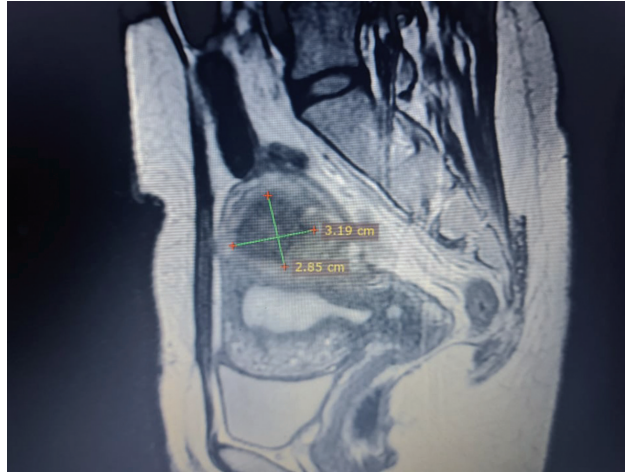
**Figure 1.** Subserous UF on the posterior uterine wall, sagittal plane



**Figure 2.** Subserous UF on the posterior uterine wall, coronary plane



**Figure 3.** Zone of post-ablation changes



**Figure 4.** Zone of post-ablation changes

The patient was offered to undergo surgical treatment because of the size of the UF, but she chose HIFU ablation as her best option for preserving fertility. After standard preparations, non-invasive extracorporeal ultrasound ablation of the myoma was started. A peak was visualized: bladder, sacrum, and intestinal loops. It was located locally enlarged at the expense of an intramural myoma, located in the posterior uterine wall sized 68x100x66mm. An average energy power of 343W was set. The total sonication time was 643 seconds, and the total energy was 220543 joules. The patient was discharged on the following day, in good general health, without subjective complaints, and afebrile. Antibiotic was prescribed for five days.

Six months later, an MRI scan showed the fibroid had shrunk to 75% of its original size with dimensions 32x36x28. (Figure 3 and 4).

Furthermore, her symptoms of menorrhagia and severe pelvic pain had disappeared. A year later, she became pregnant and gave birth to a healthy baby at 38-weeks gestation by caesarean section. At that time, the same fibroid measured only 2cm. The patient was not followed up.

## Discussion

Uterine fibroids are the most common benign tumours of the female reproductive system [1]. Commonly, they are asymptomatic, but in some patients, they cause menstrual abnormalities (frequent and/or heavy bleeding), anaemia, constipation, frequent urination, pulling pain or heaviness in the abdomen, and infertility [2]. The treatment of fibroids can be surgical

(myomectomy, hysterectomy) and conservative (hormonal treatment). During the last ten years in Bulgaria, new minimally invasive and non-invasive treatments have become popular, such as uterine artery embolization and High-Intensity Focused Ultrasound (HIFU) [3].

Ultrasound treatment is already a part of the algorithm for treating uterine fibroids in Canada [4]. Dreyer and colleagues suggested that these energy systems were promising in a study on fibroid disease. However, information and research on their impact on patients in Europe are still scarce [5].

A study at Chongqing Medical University on pregnancies in nulliparous women included 189 patients. The results showed 69.3% of successful pregnancies and successful full-term births in 76.3% of 114 pregnancies [6]. Another study from the same university compared HIFU, myomectomy, and hysterectomy in treating symptomatic uterine fibroids. The results showed significantly fewer complications and faster recovery from surgical methods, with similar long-term quality of life [7]. The effect of fibroid treatment is equally good in anteverted and retroverted uteri [8].

Our case report demonstrates that HIFU ablation is a safe method, yielding good results. It should be offered to patients as a possibility, especially if they do not want to undergo surgical treatment, lest surgery should interfere with their family planning

## Conclusions

HIFU is an important promising alternative to

surgical therapies. This method has been most beneficial in women wishing to get pregnant in the future. Preserving the option for future pregnancies in patients with UF is only one of its benefits and might be the main benefit for these women. HIFU treatment of uterine fibroids is an innovative approach and should be encouraged for more widespread adoption in similar cases. To date, information about the long-term impact of HIFU treatment on fertility rates is still scarce, as is data regarding fertility impairment. Our case, however, does demonstrate a positive impact of UF treatment.

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