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Pregnancy and live birth after high-intensity focused ultrasound ablation for fibroids and adenomyosis: two case reports

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We report two cases of high-intensity focused ultrasound ablation for fibroids and adenomyosis in women having difficulty conceiving. After the ablation, one woman got pregnant spontaneously and the other after in vitro fertilisation. Both women delivered by Caesarean section uneventfully.

Keywords: Adenomyosis; High-intensity focused ultrasound ablation; Leiomyoma

Introduction

Patients with large fibroids or adenomyosis are associated with heavy bleeding, severe anaemia, severe pain, and fertility problems. High-intensity focused ultrasound (HIFU) ablation is effective in treating uterine fibroids[1] and adenomyosis[2]. It was introduced to Hong Kong in 2019 from mainland China[3]. It focuses the ultrasound energy into the tumour to induce thermal, cavitational, and mechanical effects, with a temperature of 60°C to 90°C. It is accurate and can be used to treat fibroids and adenomyosis without harmful effects on the surrounding myometrium or fertility. We report two cases of HIFU ablation for fibroids and adenomyosis in women having difficulty conceiving. After HIFU ablation, the two woman became pregnant: one spontaneously and the other by in vitro fertilisation. Both women delivered by Caesarean section uneventfully.

Case presentation

Patient 1

In March 2020, a 33-year-old woman presented with severe dysmenorrhea and heavy menstrual flow secondary to a uterine lesion (5.3 × 9.1× 7.3 cm^3). Magnetic resonance imaging showed mixed T1 hyperintense or isointense foci consistent with adenomyosis. In July 2020, she underwent ultrasound-guided HIFU ablation of 90% to 95% of the lesion. The patient then received 3 monthly injection of gonadotrophin-releasing hormone agonist as adjuvant treatment. At the 3-month follow-up, ultrasonography showed the lesion had reduced to 4.5 × 3 cm. At 5 months after HIFU ablation, the patient experienced decreased menstrual flow and conceived spontaneously. After an uneventful antenatal period, she gave birth by Caesarean section at 37 weeks to a healthy baby weighing 2800 g. At 6 weeks after delivery, ultrasonography showed a normal uterus with no features of adenomyosis.

Patient 2

In June 2020, a 34-year-old woman presented with menorrhagia with anaemia and failure to conceive for over a year. Ultrasonography and magnetic resonance imaging confirmed an anterior intramural fibroid (5.6 × 5.2 × 7.2 cm). In July 2020, she underwent ultrasound-guided HIFU ablation. Microbubble contrast-enhanced ultrasonography confirmed ablation of over 95% of the fibroid. Four months later, her menstrual flow reduced considerably, and the fibroid reduced to 5.17 × 3.67 × 4.55 cm, approximately 60% (Figure 2). At 6 months after HIFU ablation, she underwent in-vitro fertilisation and successfully conceived. Throughout the pregnancy, the size of the fibroid remained approximately 4 cm. The patient had an uneventful antenatal period and gave birth to a 2680-g baby by Caesarean section at 38 weeks. During the procedure, the endometrial cavity was found to have no injury or adhesion secondary to the previous HIFU ablation.

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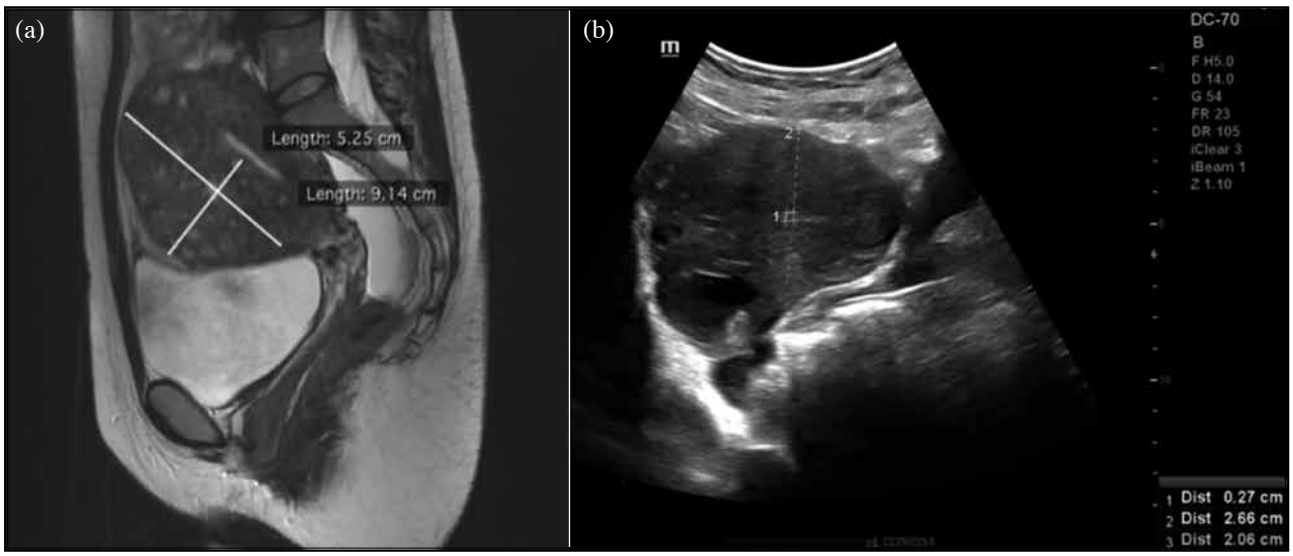

Figure 1. (a) Magnetic resonance imaging showing an extensive adenomyosis at the anterior wall of the uterus, with the wall thickness being 5.25 cm. (b) Ultrasonography at 8 weeks after delivery showing the uterus without features of adenomyosis, with the anterior wall thickness reduced to 2.66 cm.

Figure 2. (a) The axial and sagittal views of T2-weighted magnetic resonance images showing a uterine fibroid. (b) Ultrasonography showing the uterus at 3 to 4 months after high-intensity focused ultrasound ablation.

Discussion

In Hong Kong, HIFU ablation for fibroids and adenomyosis was established in a private clinic in 2019[4] after a training journey in China[3]. As of August 2021, 300 patients have been treated as day-procedure outpatients in Hong Kong. Of them, one third had adenomyosis and the remaining had uterine fibroids, together with a small number with coexisting adenomyosis.

Uterine fibroids and adenomyosis are associated with fertility problems. HIFU ablation may improve the endometrial environment for pregnancy and hence the pregnancy rate. Nonetheless, large randomised case series are needed to support this. When HIFU was first introduced, clinical reports concentrated on treating symptomatic women without the need of pregnancy. HIFU ablation was contraindicated for women expecting a baby because of the weakness of the myometrium after ablation and inadvertent ovarian failure secondary to indirect sonication at the neighbouring ovaries. However, no case report of changes in endocrine parameters or inadvertent ovarian failure after HIFU ablation has been reported. The anti-Mullerian hormone level (a marker for ovarian reserve) is similar before and after HIFU ablation in 12 women[5].

Successful vaginal delivery after magnetic resonance-guided focused ultrasound treatment of fibroids has been reported[6]. In 2012, Chinese authors reported no obstetric or labour problems after ultrasound-guided HIFU ablation in a series of patients[7,8]. Surgical myomectomy is associated with risks of infection, bleeding, adhesion formation, and early recurrence of fibroids. HIFU ablation is non-invasive and does not impair fertility. The elective caesarean section rate is 50% to 80% among women with HIFU ablation, although vaginal delivery is safe for them[7]. This may be due to the women's desire for safe and uncomplicated delivery, as in our two patients.

A waiting period of 8 months to 1 year before pregnancy was initially recommended after HIFU ablation because of the fear of uterine rupture. However, increasing evidence suggests that a shorter waiting period of 3 to 6 months is an acceptable safe practice[9]. Our two patients were conceived <6 months after HIFU ablation, with no miscarriage, premature labour, or labour complications. However, larger studies are needed to determine the safety of HIFU ablation before pregnancy.

Although HIFU ablation has shown favourable pregnancy outcomes in China[10,11], it is not commonly performed in western countries and is labelled as an experimental procedure by insurance companies. Hopefully, the two case reports can raise the awareness of physicians on HIFU ablation for fibroids and adenomyosis.

Contributors

All authors designed the study, acquired the data, analysed the data, drafted the manuscript, and critically revised the manuscript for important intellectual content. All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of interest

All authors have disclosed no conflicts of interest.

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This study received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data availability

All data generated or analysed during the present study are available from the corresponding author on reasonable request.

Ethics approval

The patients were treated in accordance with the tenets of the Declaration of Helsinki. The patients provided written informed consent for all treatments and procedures and for publication.

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