High-intensity focused ultrasound of uterine fibroids and adenomyosis: maneuver technique for bowel loops located inside the treatment window

Introduction
Uterine fibroids and adenomyosis are two commonly gynecological benign tumors negatively affected women's health [1,2]. High-intensity focused ultrasound (HIFU) is a promising alternative treatment to conventional surgery and is increasingly worldwide used because of its completely non-invasive method [3-6]. During the ablation procedure, appearance of bowel loops inside the treatment window was generally problematic because hard elements and air bubbles inside bowel loops absorb and reflect ultrasound energy caused unpredictable thermal injury even bowel perforation [7,8]. Thus, in this concise communication, we aimed to introduce the filling bladder, filling rectum, and emptying bladder (BRB) technique for manipulating bowel loops out of the treatment window in order to establish the safety profile for patients.

BRB technique
Filling the bladder with normal saline via a Foley catheter will not only elevate the uterus upward but also shove the bowel loops out of the treatment window when they tend to move into the space between the abdominal wall and the uterus as seen in Figure 1 [9,10].

Filling the rectum with ultrasound gel through a rectal catheter is also beneficial for pressing the uterus forward and reducing the distance between the uterus and anterior abdominal wall as seen in Figure 2. In addition, this manipulation also reduces bowel loop movements into the space between the uterus and the rectum [9,10].

Finally, emptying bladder concurrent with

Figure 1. (A) Sagittal T2W images show adenomyosis on the posterior wall of the anteverted uterus (white asterisk) with bowel loops above the tumor (blue arrow), which tend to move into the space between the tumor and abdominal wall (red arrow). (B) Filling bladder with 400 ml normal saline (black asterisk) generates bowel loops out of the treatment window (orange arrow).
a rectum full of ultrasound gel is predicted to produce a non-bowel treatment window as seen in Figure 3 [9,10]. In some circumstances, after emptying bladder, the bowel loops tend to relocate into the treatment window; thus, refilling the bladder with normal saline and keeping the bladder dilated during the treatment process should be considered. Kim et al. [10] stated that the most significant factor affected to the unsuccessful rate of BRB technique was the small size of uterus.

**Conclusion**

The BRB maneuver technique plays an important role in generating a non-bowel treatment window for HIFU ablation of uterine fibroids and adenomyosis.

**Disclosure statement**

Conflict of interest: The authors of this manuscript report no conflict of interest.
REFERENCES