

EP01.15

Transvaginal ultrasound-guided radiofrequency ablation for refractory enhanced myometrial vascularity: proof of concept resulting in term pregnancy

S. Bozsa^{1,2}, R. Bharathan², M. Monsorno-Dechant², T. Steindl-Tomschizek^{2,3}, C. Neumann⁴, Z. Nemeth²

1. Department of Obstetrics and Gynecology, Szechenyi Istvan University, Győr, Hungary.
2. Department of Gynecology, Hospital of the Brothers of St John of God, Vienna, Austria.
3. Division of General Gynecology and Gynecological Oncology, Department of Obstetrics and Gynecology, Comprehensive Cancer Center Vienna, Medical University of Vienna, Vienna, Austria
4. Department of Radiology and Nuclear Medicine, Hospital of the Brothers of St. John of God, Vienna, Austria.

Objectives

To present a clinical proof of concept for a novel, ultrasound-guided biophysical approach to treat refractory enhanced myometrial vascularity (EMV) when standard endovascular embolization fails.

Methods

We developed a targeted salvage protocol for a 28-year-old patient facing hysterectomy due to life-threatening bleeding after three failed uterine artery embolization attempts. The methodology integrates structural and functional Doppler parameters to overcome the perfusion-mediated "heat-sink" effect. Preoperative transvaginal Doppler identified a hypervascular nidus (Figure 1a) with a dominant 3 mm vessel and a peak systolic velocity of 32.9 cm/s. Based on these parameters, real-time transvaginal radiofrequency ablation (RFA) using a 5-9 MHz 4D probe (Figure 1b) was combined with temporary laparoscopic bilateral vascular occlusion to enable effective thermal coagulation.

Results

Continuous sonographic monitoring allowed precise energy delivery (4.6 kJ over 260s) strictly confined to the target lesion. Intraoperative color/Power Doppler confirmed the immediate and complete eradication of pathological flow (Figure 1c). The targeted thermal ablation provided definitive hemostasis while preserving the surrounding healthy myometrium. The clinical viability of this organ-sparing concept was definitively proven by the patient's subsequent spontaneous conception (Figure 1d) and successful term delivery. Long-term sonographic follow-up at 29 months confirmed sustained resolution with no EMV recurrence.

S. Bozsa: bozsa.szabolcs@sze.hu

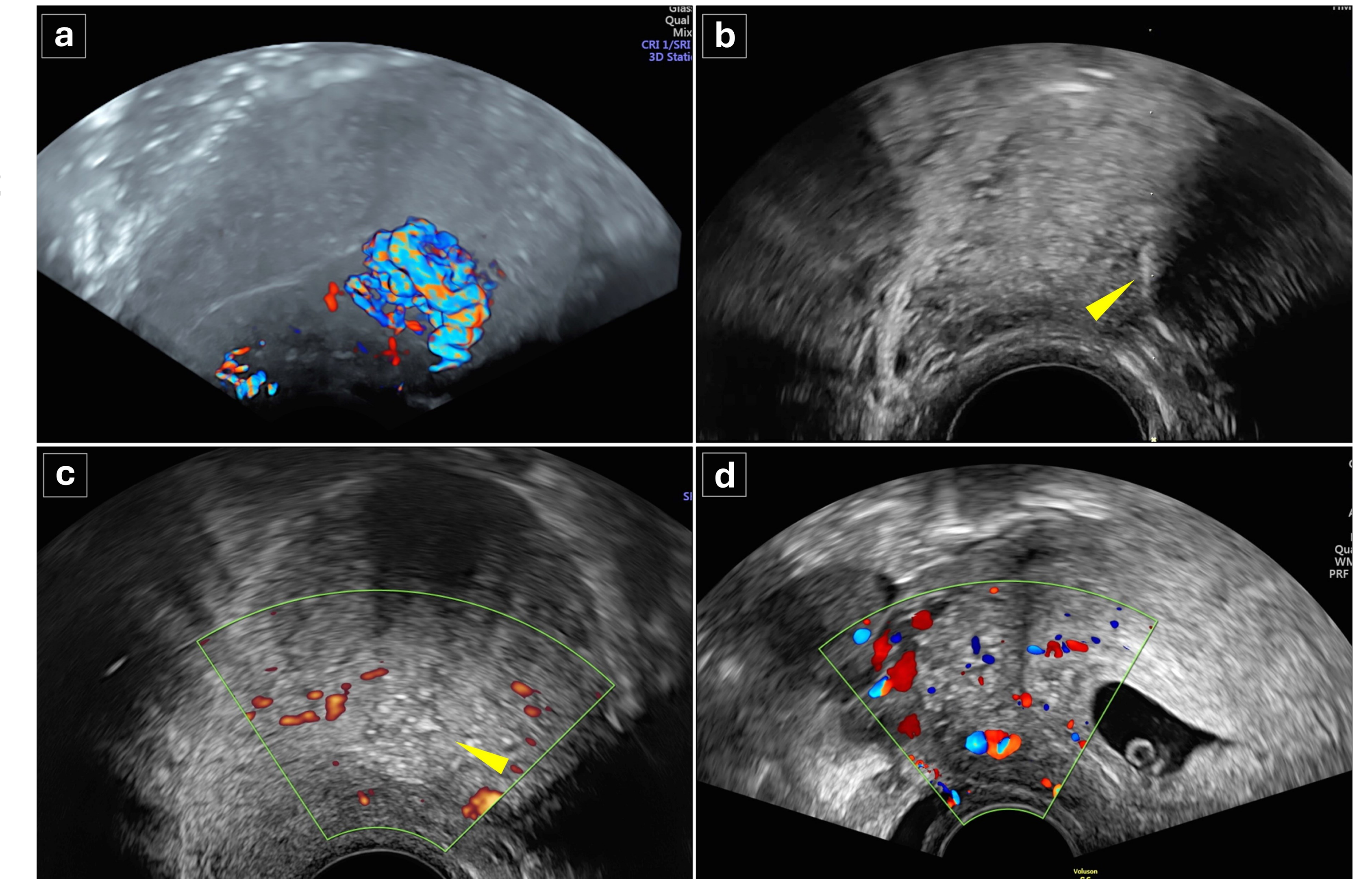


Figure 1. Transvaginal ultrasound-guided RFA for refractory EMV. (a) 3D color Doppler showing lesion spatial extent. (b) RFA electrode placement within the hypervascular lesion (arrowhead). (c) Intraoperative Power Doppler confirming complete flow eradication (arrowhead). (d) Viable 6-week pregnancy with complete EMV resolution.

Conclusions

Integrating hemodynamic assessment (vessel diameter and velocity) with real-time ultrasound-guided RFA and temporary inflow occlusion successfully overcomes the heat-sink effect. This first-in-human proof of concept establishes targeted thermal ablation as a highly selective, feasible alternative to hysterectomy for refractory EMV, preserving reproductive potential.