

Subendometrial blood flow changes by 3-dimensional power Doppler ultrasound after hysteroscopic lysis of severe intrauterine adhesions: preliminary study

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Background

- Previous studies found a marked increase in fibrous tissue within the uterine wall of patients with severe IUAs compared with controls (50%–80% vs 13%–20%).
- Myometrial fibrosis together with the adhesion-related reduction in myometrial activity may impair vascular perfusion and decrease the local levels of gonadal steroids in the residual endometrium, leading to its atrophy.

Background, *cont..*

- Supporting this theory is the finding that women with minimal adhesions are amenorrheic and have areas of inactive endometrium adjacent to adhesions

Hypothesis

- The hypothesis was that subendometrial blood flow is significantly reduced in patients with severe grade intrauterine adhesions, possibly owing to contracture of fibrous tissues on the uterine walls.
- Hysteroscopic lysis of IUAs with linear myometrial incisions possibly decreases this resistance and increases perfusion, thereby aiding endometrial regeneration.

Aim of the study

It is a **pilot observational** study to evaluate the changes in subendometrial blood flow and endometrial volume after hysteroscopic lysis of severe IUAs.

Patients and Methods

A total of **40 women** with severe IUAs in which the uterine cavity was obliterated or was very narrow and fibrotic, as diagnosed by office hysteroscopy, were recruited from the hysteroscopy unit of Ain Shams Maternity Hospital between May 2013 and April 2014.

Patients and Methods, *cont..*

All patients served as their own controls, and were included in this study only once to avoid selection bias.

All patients were nonsmokers and had not used any hormonal medication for at least 3 months before the study.

Patients and Methods, *cont..*

Patients were restricted from using nonsteroidal antiinflammatory drugs within 24 hours before any examination.

Patients with adhesions limited to the lower uterine segment or the upper cervical canal were excluded.

Patients and Methods, *cont..*

The primary complaint was infertility and/or menstrual disturbance, with normal basal hormonal levels of follicle-stimulating hormone, luteinizing hormone, thyroid-stimulating hormone, and prolactin.

Table 1

Demographic data of study participants (n 5 40)

Variable	Value
Age, yr, mean \pm SD (range)	25.26 \pm 2.69 (20–36)
Parity, median (range)	1 (0–4)
Duration of infertility, yr, mean \pm SD (range)	4.49 \pm 2.19 (2–10)
Primary infertility, n (%)	16 (40)
Secondary infertility, n (%)	24 (60)
Amenorrhea, n (%)	20 (50)
Hypomenorrhea, n (%)	20 (50)

Patients and Methods, *cont..*

- We used a transvaginal ultrasound unit that provides 3D imaging with powerDoppler sonography, with which any desired plane through an organ can be obtained.
- A volume of a region of interest, as endometrial volume, even in irregularly shaped structures, can be acquired and stored.

Patients and Methods, *cont..*

The built-in VOCAL (Virtual Organ Computer-Aided Analysis) imaging software program was used to calculate the indices of blood flow in the subendometrium.

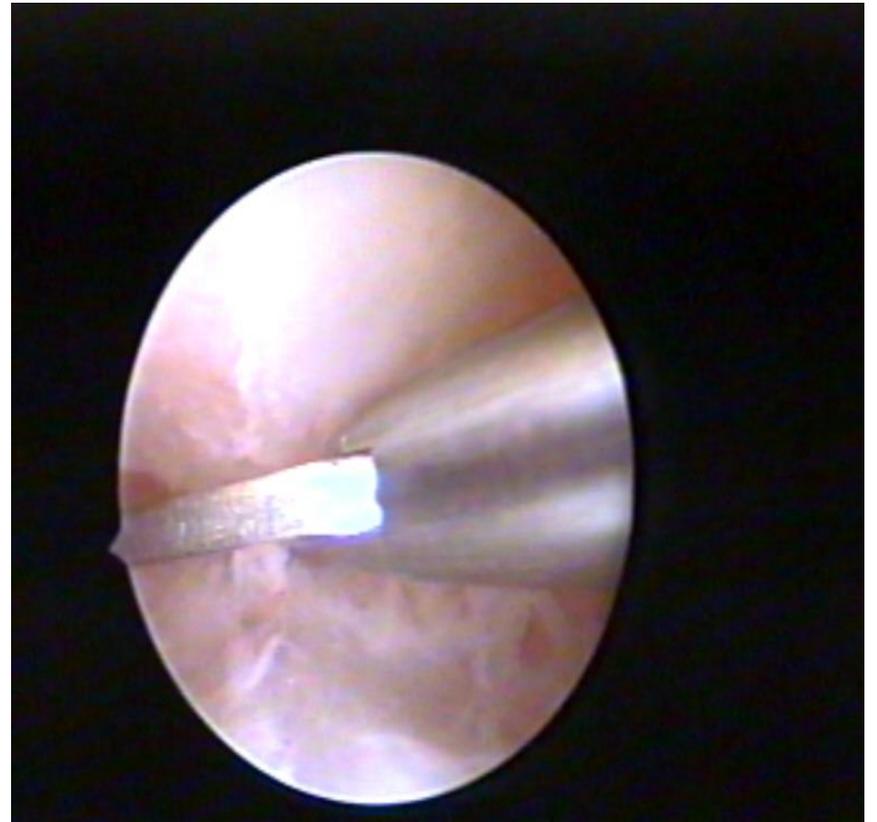
Patients and Methods, *cont..*

In all patients, transvaginal 3D power Doppler sonography was performed **1 day** before hysteroscopic lysis of IUAs and then repeated **1 month** later by the same sonographer.

Surgical Technique

Lysis of IUAs was started using 5F pointed-tip semirigid scissors in a 5-mm rigid office hysteroscope (Karl Storz GmbH & Co. KG, Tuttlingen, Germany).

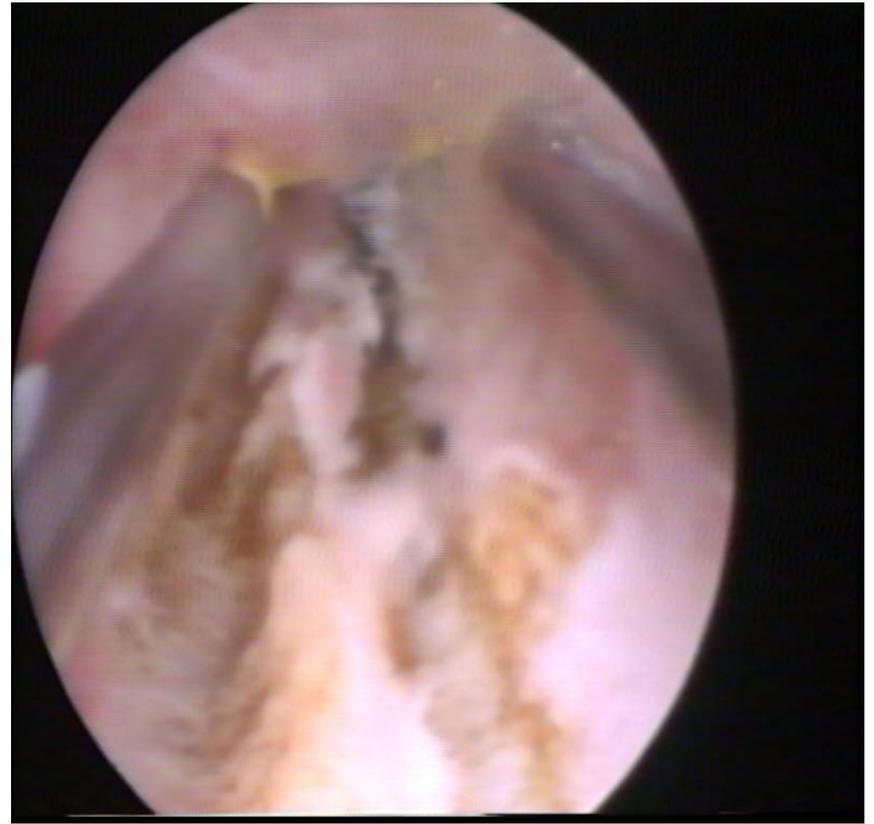
Lysis with scissors

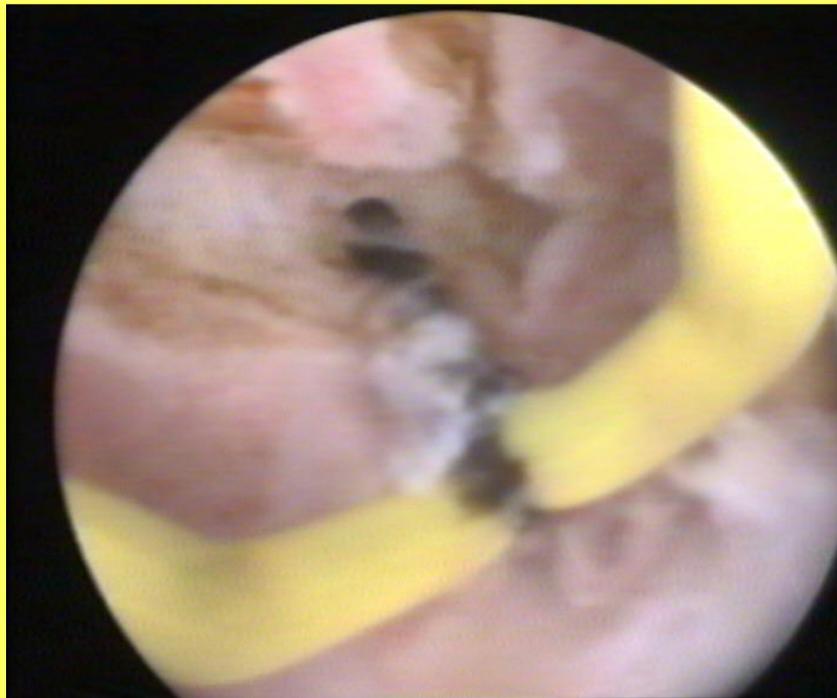
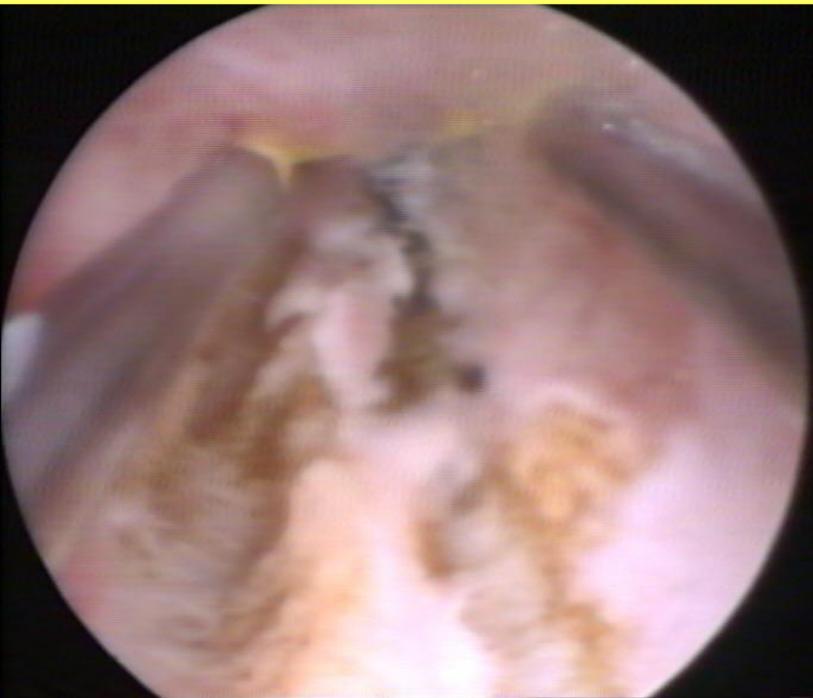
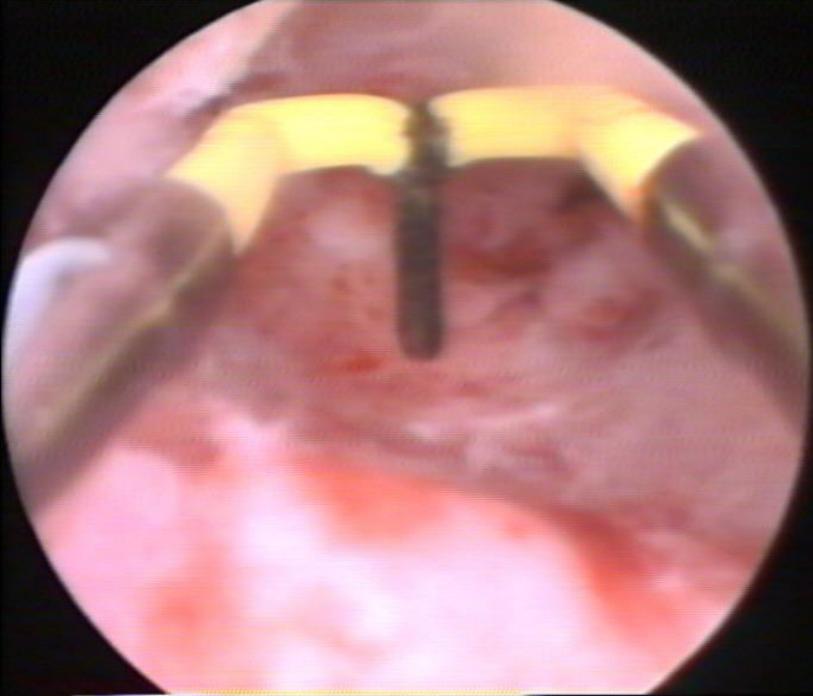


Patients and Methods, *cont..*

Patients with a tubular uterine cavity underwent hysteroscopic metroplasty using a monopolar knife, entailing 4 to 6 linear releasing incisions along the length of the uterine wall, from fundus to isthmus, perpendicular to the wall of the uterus with depth did not exceed 5 to 7 mm.

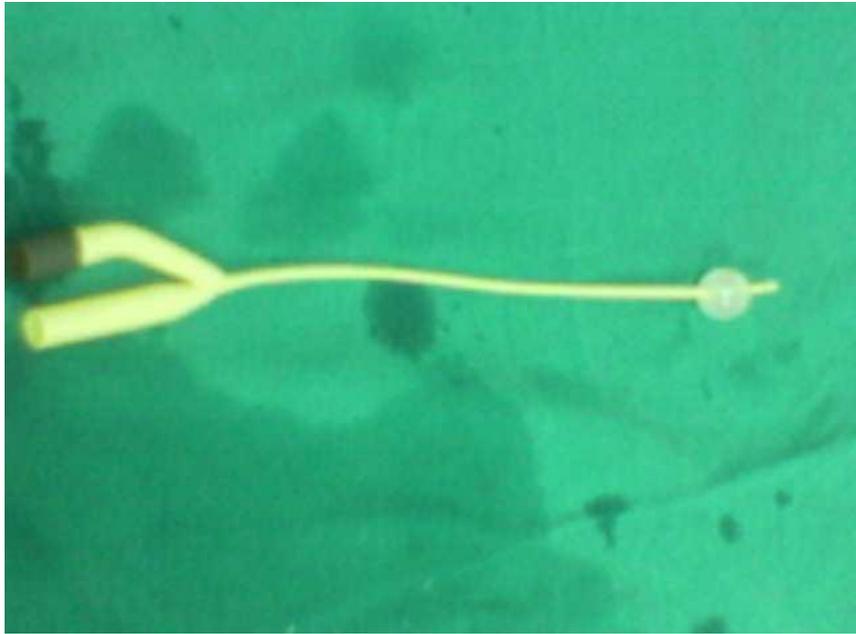
Hysteroscopic metroplasty





Patients and Methods, *cont..*

- The procedure was deemed complete only when an adequate uterine cavity was obtained.
- After lysis of IUAs, an intrauterine balloon distended with 3 to 4 mL of saline covered with a fresh amnion graft was applied as a temporary biological barrier.



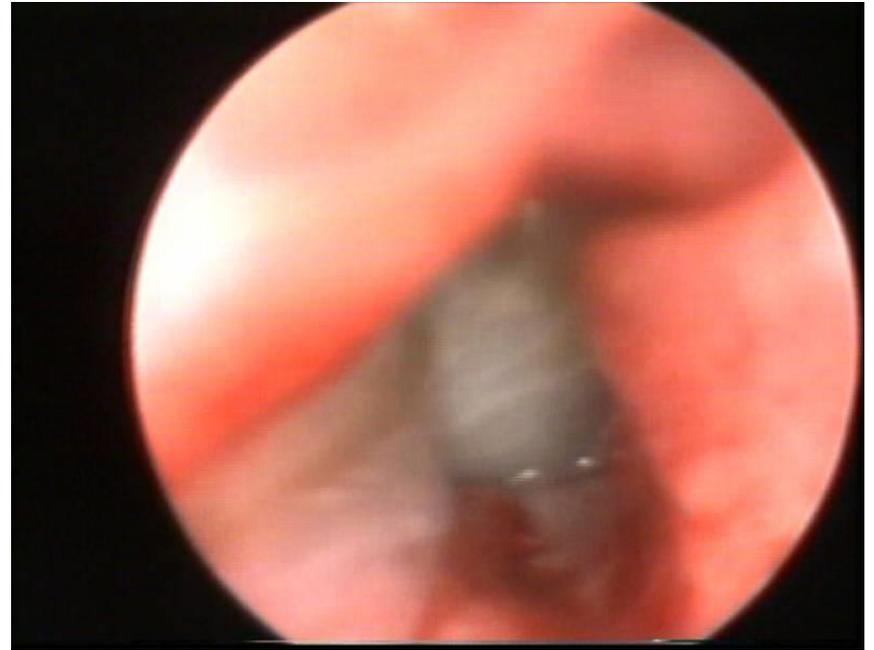
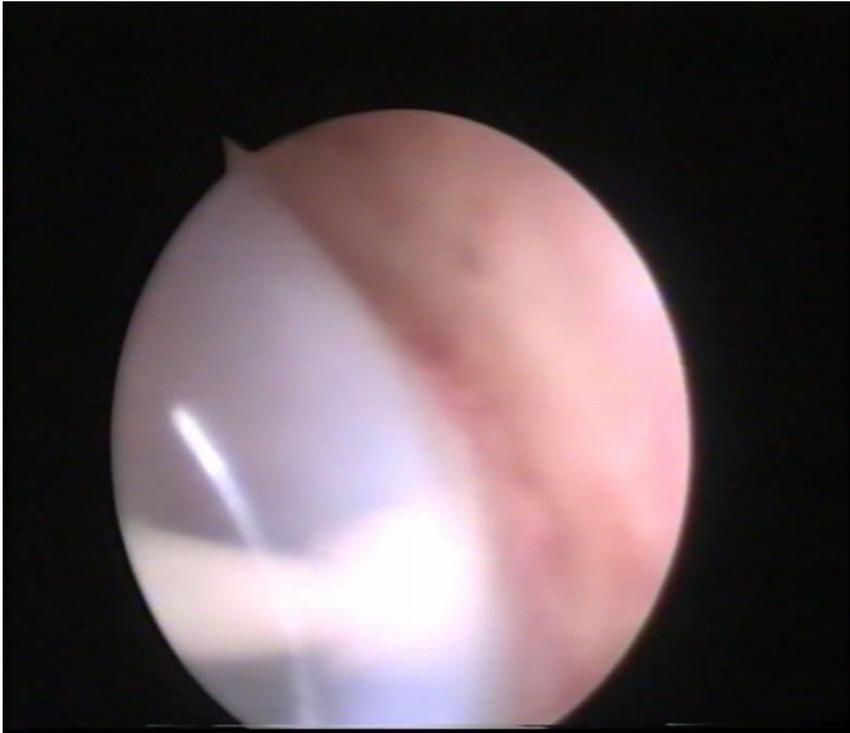
Balloon of Pediatric Folley Catheter



Amniotic membrane on a Foley catheter



IUB & Fresh amnion graft



Patients and Methods, *cont..*

- All patients were discharged on the day of surgery with instructions to report balloon expulsion or any sign or symptom of pelvic infection, such as pelvic pain, fever, or abnormal vaginal discharge.
- No patient received any hormonal treatment during the follow-up period.

Patient Follow-up

At 2 weeks after the procedure, the intrauterine balloon was removed transcervically using a crocodile forceps.

IUB removal



Patients and Methods, *cont..*

Transvaginal 3D ultrasonography with power Doppler was performed at 1 **month** postoperatively to assess changes in subendometrial blood flow and endometrial volume.

Patients and Methods, *cont..*

An office hysteroscopy was performed at 1 month postoperatively to assess restoration of the normal uterine cavity and evaluate the need for a second lysis procedure.

Results

In this study, the possible etiologic cause of IUA was caesarian section in 16 women (40%), dilation and curettage (D&C) in 10 (25%), myomectomy in 4 (10%), genital tuberculosis in 3 (7.5%), and unknown cause in 7 (17.5%).

Results, cont..

Preoperative 3D power Doppler ultrasound revealed sparse subendometrial vascularity in 12 women (30%) and absent subendometrial blood flow in 28 women (70%).

Table 2

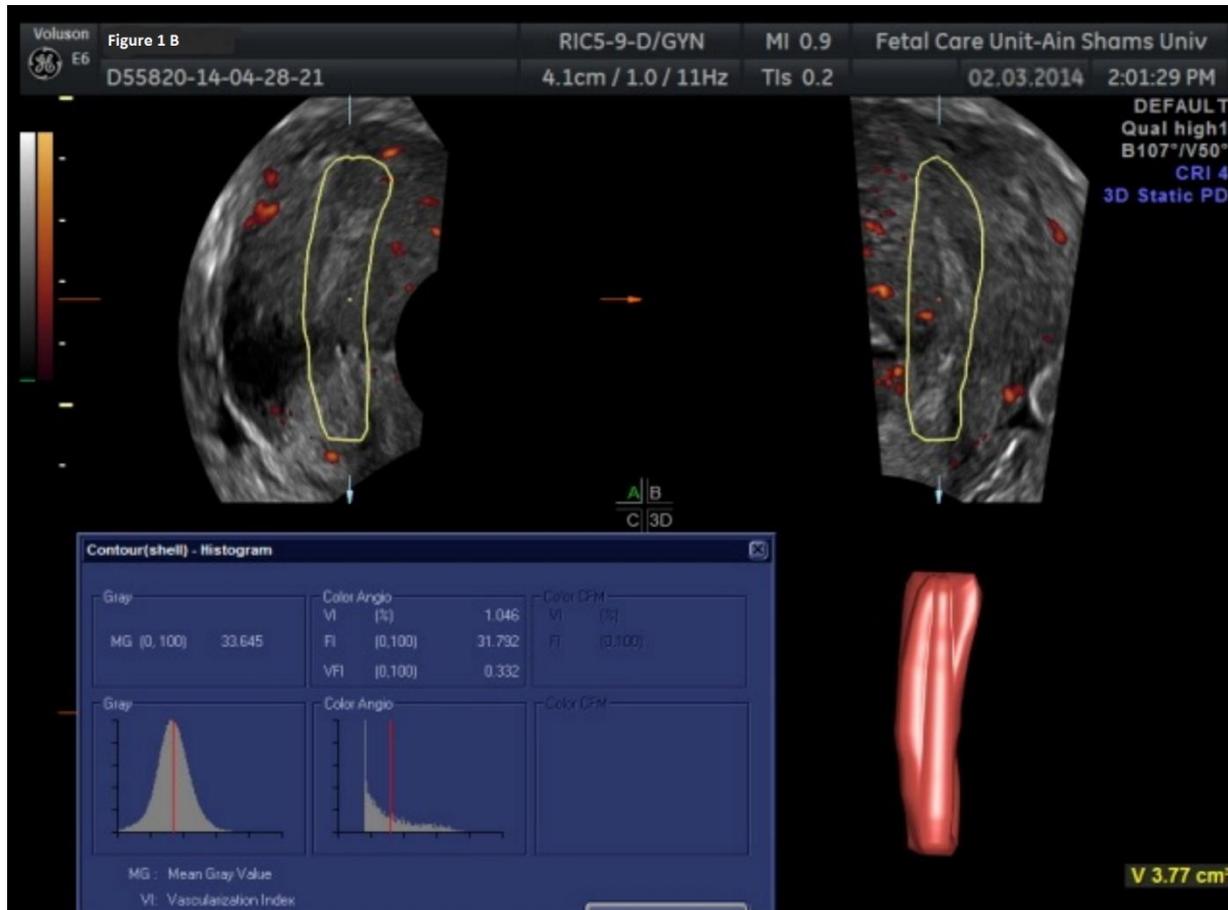
Subendometrial blood flow indices and endometrial volume changes after hysteroscopic lysis of severe IUAs (n 5 40)

Variable	Preoperative		Postoperative		p value
	Median	IQR	Median	IQR	
Endometrial volume (V), mL	1.49	1.32–2.31	3.13	1.99–3.58	<.001
VI	0.14	0.05–0.88	0.49	0.13–1.20	<.001
FI	21.17	18.05–26.15	25.72	21.46–29.64	<.001
VFI	0.05	0.01–0.33	1.04	0.26–1.65	<.001

The vascular indices and endometrial volume before hysteroscopic lysis of severe IUA.



The vascular indices and endometrial volume after hysteroscopic lysis of severe IUA



Conclusion

Patients with severe IUAs have significantly decreased subendometrial blood flow, possibly as a consequence of the traction exerted by the IUAs on the uterine walls.

Conclusion, *cont.*

Lysis of these adhesions and myometrial scoring releases the traction and decreases the resistance against subendometrial blood flow, thereby increasing endometrial volume.

A close-up photograph of a vibrant red rose, its petals glistening with numerous small water droplets. The rose is set against a dark, textured grey background. The stem and a few green leaves are visible, extending from the bottom left towards the center. The lighting is dramatic, highlighting the texture of the petals and the individual droplets.

Thank you