



## Medical Policy

# Laparoscopic, Percutaneous, and Transcervical Techniques for Uterine Fibroids Myolysis

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### Related Policies

- MRI-Guided Focused Ultrasound for the Treatment of Uterine Fibroids and Other Tumors, #[243](#)

### Policy

#### Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity Medicare HMO Blue<sup>SM</sup> and Medicare PPO Blue<sup>SM</sup> Members

Laparoscopic or transcervical radiofrequency ablation (RFA) as a treatment of symptomatic uterine fibroids is considered [MEDICALLY NECESSARY](#) in individuals 18 years and older when **ALL** of the following conditions are met:

- Evidence of uterine fibroids via ultrasound that are less than 10cm in diameter for laparoscopic RFA with Acessa<sup>TM</sup> or 7cm for transcervical RFA with Sonata<sup>TM</sup>, **AND**
- Individual desires a uterine sparing treatment approach or is ineligible for hysterectomy, or other uterine-sparing alternatives to RFA (e.g., laparoscopic myomectomy, uterine artery embolization [UAE]) **AND**
- Individual has experienced **at least one** of the following symptoms that are a direct result of the fibroid(s):
  - Menorrhagia or other abnormal uterine bleeding\* that interferes with daily activities or causes anemia
  - Pelvic pain or pressure
  - Lower back pain
  - Urinary symptoms (e.g., urinary frequency, urgency) related to bulk compression of the bladder
  - Gastrointestinal symptoms related to bulk compression of the bowel (e.g., constipation, bloating)
  - Dyspareunia (painful or difficult sexual relations).

Other laparoscopic, transcervical, or percutaneous techniques for myolysis of uterine fibroids, including use of laser ablation or bipolar needles, cryomyolysis, and magnetic resonance imaging-guided laser ablation, are considered **INVESTIGATIONAL**.

Abnormal uterine bleeding refers to uterine bleeding of abnormal frequency, duration, and volume that interferes with an individual's quality of life. Individuals with abnormal uterine bleeding with an inadequate response to appropriately selected medical therapy may be considered for alternate uterine-sparing interventions. In individuals >45 years of age with menorrhagia or other abnormal bleeding, endometrial biopsy is recommended prior to treatment to rule out endometrial malignancy and/or additional assessment to rule out a risk for uterine leiomyosarcoma.

Clinical trial experience with radiofrequency ablation (RFA) has been limited to individuals with overall uterine size ≤16 gestational weeks size based on pelvic examination. In individuals where fibroids cannot be distinguished from adenomyosis on ultrasound, advanced imaging (e.g., magnetic resonance imaging [MRI]) may be required. For individuals with pelvic pain, alternative causes such as endometritis and active pelvic inflammatory disease should be excluded prior to treatment with RFA.

### **Treatment Approach Considerations for Radiofrequency Ablation**

Uterine fibroids are categorized according to the International Federation of Gynaecology and Obstetrics (FIGO) leiomyoma subclassification system (see Table PG1). Choice of laparoscopic versus transcervical RFA treatment is dependent on fibroid number, size, type and location, and patient preferences. For example, predominantly lower uterine segment or cervical leiomyomata, or those with a predominant submucosal location or intramural FIGO type 2 or 3 fibroids, may suggest a transcervical approach, whereas fibroids with largely fundal or extramural components may suggest a laparoscopic approach. Individuals aiming to avoid future deliveries via obligate cesarean section may prefer a transcervical approach. Select individual with numerous fibroids may benefit from combined laparoscopic RFA and laparoscopic myomectomy. Individuals with intramural fibroids, intra-abdominal adhesions, or medical contraindications may not be candidates for alternative uterine-sparing interventions.

**Table PG1. FIGO Leiomyoma Subclassification System**

Group	Type	Description
Submucosal	0	Pedunculated intracavitary
	1	<50% intramural (≥50% submucosal)
	2	≥50% intramural (<50% submucosal)
Other	3	100% intramural, contacting endometrium
	4	100% intramural, no endometrial or subserosal contact
	5	Subserosal, ≥50% intramural
	6	Subserosal, <50% intramural
	7	Pedunculated subserosal
	8	Non-myometrial location (eg, cervical, broad ligament, parasitic)
Hybrid	X-X	Both submucosal and subserosal components. Submucosal component designated by first number and subserosal component designated by second number.

FIGO: International Federation of Gynaecology and Obstetrics.

Table adapted from Gomez et al (2021). MRI-based pictorial review of the FIGO classification system for uterine fibroids. *Abdom Radiol.* 46(5): 2146-2155. PMID: 33385249

### **Reinterventions**

Reintervention with RFA may be considered for individuals meeting policy criteria with documentation of new or recurrent fibroid development following a partial response with the initial procedure. However, data on reinterventions for new or recurrent fibroids is limited and documentation procedures for repeat anatomic mapping of fibroids are not standardized.

## **Prior Authorization Information**

### **Inpatient**

- For services described in this policy, precertification/preauthorization **IS REQUIRED** for all products if the procedure is performed **inpatient**.

#### **Outpatient**

- For services described in this policy, see below for products where prior authorization **might be required** if the procedure is performed **outpatient**.

	<b>Outpatient</b>
<b>Commercial Managed Care (HMO and POS)</b>	Prior authorization is <b>not</b> required.
<b>Commercial PPO and Indemnity</b>	Prior authorization is <b>not</b> required.
<b>Medicare HMO Blue<sup>SM</sup></b>	Prior authorization is <b>not</b> required.
<b>Medicare PPO Blue<sup>SM</sup></b>	Prior authorization is <b>not</b> required.

### **CPT Codes / HCPCS Codes / ICD Codes**

*Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.*

*Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.*

*The following codes are included below for informational purposes only; this is not an all-inclusive list.*

**The above medical necessity criteria MUST be met for the following codes to be covered for Commercial Members: Managed Care (HMO and POS), PPO, Indemnity, Medicare HMO Blue and Medicare PPO Blue:**

#### **CPT Codes**

<b>CPT codes:</b>	<b>Code Description</b>
58674	Laparoscopy, surgical, ablation of uterine fibroid(s) including intraoperative ultrasound guidance and monitoring, radiofrequency
58580	Transcervical ablation of uterine fibroid(s), including intraoperative ultrasound guidance and monitoring, radiofrequency

**The following ICD Diagnosis Codes are considered medically necessary when submitted with the CPT codes above if medical necessity criteria are met:**

**Note: A diagnosis code from column 1 must be accompanied by any diagnosis code from column 2 to be considered medically necessary.**

<b>Column 1 Diagnosis code</b>	<b>Column 1 Description</b>	<b>Column 2 Diagnosis code</b>	<b>Column 2 Description</b>
D25.0	Submucous leiomyoma of the uterus	K59.00	Constipation, unspecified
D25.1	Intramural leiomyoma of the uterus	K59.01	Slow transit constipation

D25.2	Subserosal leiomyoma of the uterus	K59.02	Outlet dysfunction constipation
D25.9	Leiomyoma of the uterus, unspecified	K59.03	Drug induced constipation
		K59.04	Chronic idiopathic constipation
		K59.09	Other constipation
		M54.50	Unspecified low back pain, including loin pain and lumbago
		M54.51	Vertebrogenic low back pain
		M54.59	Other low back pain
		N92.0	Excessive and frequent menstruation with regular cycle
		N92.1	Excessive and frequent menstruation with irregular cycle
		N92.2	Excessive menstruation at puberty
		N92.4	Excessive bleeding in the premenopausal period

	N93.8	Other specified abnormal uterine and vaginal bleeding
	N93.9	Abnormal uterine and vaginal bleeding, unspecified
	N94.10	Unspecified dyspareunia
	N94.11	Superficial (introital) dyspareunia
	N94.12	Deep dyspareunia
	N94.19	Other specified dyspareunia
	R10.10	Upper abdominal pain, unspecified
	R10.11	Right upper quadrant pain
	R10.12	Left upper quadrant pain
	R10.13	Epigastric pain
	R10.2	Pelvic and perineal pain
	R10.30	Lower abdominal pain, unspecified

	R10.31	Right lower quadrant pain
	R10.32	Left lower quadrant pain
	R10.33	Periumbilical pain
	R10.811	Right upper quadrant abdominal tenderness
	R10.812	Left upper quadrant abdominal tenderness
	R10.813	Right lower quadrant abdominal tenderness
	R10.814	Left lower quadrant abdominal tenderness
	R10.815	Periumbilic abdominal tenderness
	R10.816	Epigastric abdominal tenderness
	R10.817	Generalized abdominal tenderness
	R10.819	Abdominal tenderness, unspecified site
	R10.821	Right upper quadrant

		rebound abdominal tenderness
	R10.822	Left upper quadrant rebound abdominal tenderness
	R10.823	Right lower quadrant rebound abdominal tenderness
	R10.824	Left lower quadrant rebound abdominal tenderness
	R10.825	Periumbilic rebound abdominal tenderness
	R10.826	Epigastric rebound abdominal tenderness
	R10.827	Generalized rebound abdominal tenderness
	R10.829	Rebound abdominal tenderness, unspecified site
	R10.84	Generalized abdominal pain
	R10.9	Unspecified abdominal pain
	R14.0	Abdominal distension (gaseous)

	R32	Unspecified urinary incontinence
	R39.81	Functional urinary incontinence
	R39.82	Chronic bladder pain
	R39.89	Other symptoms and signs involving the genitourinary system
	R39.9	Unspecified symptoms and signs involving the genitourinary system

## Description

### Uterine Fibroids

Uterine fibroids, also known as leiomyomas, are among the most common conditions affecting women in their reproductive years; symptoms include menorrhagia, pelvic pressure, or pain. It is estimated that uterine fibroids occur in up to 70% of women by menopause, with approximately 25% of these being clinically significant and requiring intervention.<sup>1</sup> The prevalence rate of uterine fibroids is 2- to 3 times higher among Black women compared with White women, and there are higher rates of hysterectomy and myomectomy compared with non-surgical therapy, potentially demonstrating a disparity in access to uterine-sparing interventions.<sup>2,3</sup>

### Treatment

Surgery, including hysterectomy and various myomectomy procedures, is considered the criterion standard for symptom resolution. However, there is the potential for surgical complications, and, in the case of a hysterectomy, the uterus is not preserved. In addition, multiple myomectomies may be associated with longer operating time, postoperative febrile morbidity, and development of pelvic adhesions. There has been long-standing research interest in developing minimally invasive alternatives for treating uterine fibroids, including procedures that retain the uterus and permit future childbearing. Treatment options include uterine artery embolization and transcutaneous magnetic resonance imaging-guided focused ultrasound therapy (see evidence review 7.01.109). Various techniques to induce myolysis have also been studied including Nd:YAG lasers, bipolar electrodes, cryomyolysis, and radiofrequency ablation. With these techniques, an energy source is used to create areas of necrosis within uterine fibroids, reducing their volume and thus relieving symptoms. Early methods involved multiple insertions of probes into the fibroid, performed without imaging guidance. There were concerns about serosal injury and abdominopelvic adhesions with these techniques, possibly due to the multiple passes through the serosa needed to treat a single fibroid.<sup>4</sup> Newer systems using radiofrequency energy do not require repetitive insertions of needle electrodes. Ultrasonography is used laparoscopically or transcervically to determine the size and location of fibroids, to guide the probe, and to ensure the probe is in the correct location so that optimal energy is applied to the fibroid. Percutaneous approaches using magnetic resonance imaging guidance have also been reported.

## Summary



## **Description**

Various minimally invasive treatments for uterine fibroids have been proposed as alternatives to surgery. Among these approaches are laparoscopic, percutaneous, and transcervical techniques to induce myolysis, which includes radiofrequency ablation (RFA), laser and bipolar needles, cryomyolysis, and magnetic resonance imaging-guided laser ablation.

## **Summary of Evidence**

For individuals who have symptomatic uterine fibroids who receive radiofrequency ablation (RFA), the evidence includes prospective cohorts, randomized controlled trials (RCTs), and systematic reviews. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. The meta-analysis found low rates of reintervention with RFA and quality of life outcomes that were similar to uterine artery embolization and myomectomy at 12 months. Data on reintervention rates at 36 months were limited to 1 RCT and 1 cohort study with high loss to follow-up. No studies reported reintervention rates at 60 months. Two RCTs found that RFA was noninferior and one RCT found that RFA was superior to laparoscopic myomectomy on the primary outcome: length of hospitalization. A number of secondary outcomes were reported at 12 or 24 months in 2 RCTs, including symptoms and quality of life. One RCT found that both symptoms and quality of life were significantly better with myomectomy compared with RFA at 12 months. The procedure has faster recovery than myomectomy and provides a reduction in symptoms and improvement in quality of life in the short term. Recurrence and reintervention rates at longer follow-up are unknown. Well-designed comparative trials with longer follow-up are needed to determine the effect of RFA on health outcomes compared with other treatment options such as myomectomy. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have symptomatic uterine fibroids who receive laser or bipolar needles, the evidence includes case series. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. The case series were published in the 1990s, and the procedures used then may not reflect current practice. RCTs comparing laser or bipolar needles with alternative treatments for uterine fibroids are needed to evaluate the safety and efficacy of this technology adequately. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have symptomatic uterine fibroids who receive cryomyolysis, the evidence includes case series. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. Among the few case series, sample sizes were small ( $\leq 20$  patients). RCTs comparing cryomyolysis with alternative treatments for uterine fibroids are needed to evaluate the safety and efficacy of this technology adequately. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have symptomatic uterine fibroids who receive magnetic resonance imaging (MRI)-guided laser ablation, the evidence includes one study with historical controls. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. A single study with historical controls is not sufficiently robust to evaluate this technology. RCTs comparing MRI-guided laser ablation with alternative treatments for uterine fibroids are needed to evaluate safety and efficacy adequately. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

## **Additional Information**

### **2021 Input**

Clinical input was sought to help determine whether the use of laparoscopic or RFA for individuals with symptomatic uterine fibroids would provide a clinically meaningful improvement in the net health outcome and whether the use is consistent with generally accepted medical practice. In response to requests, clinical input on the use of RFA was received from 3 respondents: 1 society-level response including input from physicians affiliated with academic medical centers and 2 physician-level responses with academic affiliations.

For individuals with symptomatic uterine fibroids, clinical input provides consistent support that the use of laparoscopic or transcervical RFA provides a clinically meaningful improvement in the net health outcome and is consistent with generally accepted medical practice for the following indication:

Women 18 years and older when ALL of the following conditions are met:

- Evidence of uterine fibroids via ultrasound that are less than 10 cm in diameter for laparoscopic RFA with Acessa or 7 cm for transcervical RFA with Sonata; AND
- Patient desires a uterine-sparing treatment approach or is ineligible for hysterectomy or other uterine-sparing alternatives to RFA (e.g., laparoscopic myomectomy, uterine artery embolization [UAE]); AND
- Patient has experienced at least 1 of the following symptoms that are a direct result of the fibroid(s):
  - Menorrhagia or other abnormal uterine bleeding that interferes with daily activities or causes anemia;
  - Pelvic pain or pressure;
  - Urinary symptoms (e.g., urinary frequency, urgency) related to bulk compression of the bladder;
  - Gastrointestinal symptoms related to bulk compression of the bowel (e.g., constipation, bloating);
  - Dyspareunia (painful or difficult sexual relations).

## Policy History

Date	Action
4/2025	Annual policy review. References updated. Policy statements unchanged. Clarified coding information.
4/2024	Annual policy review. Description, summary and references updated. Policy statements unchanged.
1/2024	Clarified coding information.
4/2023	Annual policy review. Minor editorial refinements to policy statements; intent unchanged.
4/2022	Annual policy review. Policy statements clarified. Policy intent remains unchanged. Title changed to Laparoscopic, percutaneous, and transcervical techniques for uterine fibroid myolysis.
11/2020	Policy title clarified. Terminology for transcervical procedure clarified. Policy statements unchanged. 11/1/2020.
10/2020	New medically necessary indications added for laparoscopic and transcervical radiofrequency ablation for the treatment of uterine fibroids. Clarified coding information, 10/1/2020.
10/2019	Annual policy review. Description, summary and references updated. Policy statements unchanged.
10/2018	Annual policy review. No changes to policy statements. New references added. Background and summary clarified.
9/2017	Annual policy review. New references added.
1/2017	Clarified coding information for the 2017 code changes.
10/2016	Annual policy review. New references added.
8/2015	Annual policy review. New references added.
9/2014	Annual policy review. New references added.
6/2014	Coding information clarified.
10/2013	Annual policy review. New references added.
11/2011-4/2012	Medical policy ICD 10 remediation: Formatting, editing and coding updates. No changes to policy statements.
9/2011	Reviewed - Medical Policy Group - Urology, Obstetrics and Gynecology. No changes to policy statements.
10/2010	Reviewed - Medical Policy Group - Obstetrics and Gynecology. No changes to policy statements.
7/2010	Medical Policy 244 effective 7/10 describing on-going non-coverage

## Information Pertaining to All Blue Cross Blue Shield Medical Policies

Click on any of the following terms to access the relevant information:

## References

1. Management of Symptomatic Uterine Leiomyomas: ACOG Practice Bulletin, Number 228. *Obstet Gynecol.* Jun 01 2021; 137(6): e100-e115. PMID 34011888
2. Laughlin-Tommaso SK, Jacoby VL, Myers ER. Disparities in Fibroid Incidence, Prognosis, and Management. *Obstet Gynecol Clin North Am.* Mar 2017; 44(1): 81-94. PMID 28160895
3. Stewart EA, Nicholson WK, Bradley L, et al. The burden of uterine fibroids for African-American women: results of a national survey. *J Womens Health (Larchmt).* Oct 2013; 22(10): 807-16. PMID 24033092
4. Jones S, O'Donovan P, Toub D. Radiofrequency ablation for treatment of symptomatic uterine fibroids. *Obstet Gynecol Int.* 2012; 2012: 194839. PMID 21961009
5. Davis MR, Soliman AM, Castelli-Haley J, et al. Reintervention Rates After Myomectomy, Endometrial Ablation, and Uterine Artery Embolization for Patients with Uterine Fibroids. *J Womens Health (Larchmt).* Oct 2018; 27(10): 1204-1214. PMID 30085898
6. Sandberg EM, Tummers FHMP, Cohen SL, et al. Reintervention risk and quality of life outcomes after uterine-sparing interventions for fibroids: a systematic review and meta-analysis. *Fertil Steril.* Apr 2018; 109(4): 698-707.e1. PMID 29653718
7. Havryliuk Y, Setton R, Carlow JJ, et al. Symptomatic Fibroid Management: Systematic Review of the Literature. *JSLs.* 2017; 21(3). PMID 28951653
8. Lin L, Ma H, Wang J, et al. Quality of Life, Adverse Events, and Reintervention Outcomes after Laparoscopic Radiofrequency Ablation for Symptomatic Uterine Fibroids: A Meta-Analysis. *J Minim Invasive Gynecol.* 2019; 26(3): 409-416. PMID 30253997
9. Bradley LD, Pasic RP, Miller LE. Clinical Performance of Radiofrequency Ablation for Treatment of Uterine Fibroids: Systematic Review and Meta-Analysis of Prospective Studies. *J Laparoendosc Adv Surg Tech A.* Dec 2019; 29(12): 1507-1517. PMID 31702440
10. Arnreiter C, Oppelt P. A Systematic Review of the Treatment of Uterine Myomas Using Transcervical Ultrasound-Guided Radiofrequency Ablation with the Sonata System. *J Minim Invasive Gynecol.* Aug 2021; 28(8): 1462-1469. PMID 33892184
11. Zhang J, Go VA, Blanck JF, et al. A Systematic Review of Minimally Invasive Treatments for Uterine Fibroid-Related Bleeding. *Reprod Sci.* Oct 2022; 29(10): 2786-2809. PMID 34480321
12. Chen I, Berman JM, Balk EM, et al. Radiofrequency Ablation for the Treatment of Uterine Fibroids: A Systematic Review and Meta-Analysis by the AAGL Practice Committee. *J Minim Invasive Gynecol.* Sep 12 2024. PMID 39277104
13. Brucker SY, Hahn M, Kraemer D, et al. Laparoscopic radiofrequency volumetric thermal ablation of fibroids versus laparoscopic myomectomy. *Int J Gynaecol Obstet.* Jun 2014; 125(3): 261-5. PMID 24698202
14. Rattray DD, Weins L, Regush LC, et al. Clinical outcomes and health care utilization pre- and post-laparoscopic radiofrequency ablation of symptomatic fibroids and laparoscopic myomectomy: a randomized trial of uterine-sparing techniques (TRUST) in Canada. *Clinicoecon Outcomes Res.* 2018; 10: 201-212. PMID 29670382
15. Yu S, Silverberg K, Bhagavath B, et al. Post-Market Safety of Laparoscopic Ultrasound-Guided Radiofrequency Ablation. *JSLs.* 2020; 24(4). PMID 33510567
16. Yu S, Bhagavath B, Shobeiri SA, et al. Clinical and Patient Reported Outcomes of Pre- and Postsurgical Treatment of Symptomatic Uterine Leiomyomas: A 12-Month Follow-up Review of TRUST, a Surgical Randomized Clinical Trial Comparing Laparoscopic Radiofrequency Ablation and Myomectomy. *J Minim Invasive Gynecol.* Jun 2022; 29(6): 726-737. PMID 35085837
17. Hahn M, Brucker S, Kraemer D, et al. Radiofrequency Volumetric Thermal Ablation of Fibroids and Laparoscopic Myomectomy: Long-Term Follow-up From a Randomized Trial. *Geburtshilfe Frauenheilkd.* May 2015; 75(5): 442-449. PMID 26097247

18. Krämer B, Hahn M, Taran FA, et al. Interim analysis of a randomized controlled trial comparing laparoscopic radiofrequency volumetric thermal ablation of uterine fibroids with laparoscopic myomectomy. *Int J Gynaecol Obstet.* May 2016; 133(2): 206-11. PMID 26892690
19. Berman JM, Guido RS, Garza Leal JG, et al. Three-year outcome of the Halt trial: a prospective analysis of radiofrequency volumetric thermal ablation of myomas. *J Minim Invasive Gynecol.* 2014; 21(5): 767-74. PMID 24613404
20. Berman JM, Bradley L, Hawkins SM, et al. Uterine Fibroids in Black Women: A Race-Stratified Subgroup Analysis of Treatment Outcomes After Laparoscopic Radiofrequency Ablation. *J Womens Health (Larchmt).* Apr 2022; 31(4): 593-599. PMID 34287028
21. Jacoby VL, Parvataneni R, Oberman E, et al. Laparoscopic Radiofrequency Ablation of Uterine Leiomyomas: Clinical Outcomes during Early Adoption into Surgical Practice. *J Minim Invasive Gynecol.* 2020; 27(4): 915-925. PMID 31376584
22. Miller CE, Osman KM. Transcervical Radiofrequency Ablation of Symptomatic Uterine Fibroids: 2-Year Results of the SONATA Pivotal Trial. *J Gynecol Surg.* Dec 01 2019; 35(6): 345-349. PMID 32226268
23. Lukes A, Green MA. Three-Year Results of the SONATA Pivotal Trial of Transcervical Fibroid Ablation for Symptomatic Uterine Myomata. *J Gynecol Surg.* Oct 01 2020; 36(5): 228-233. PMID 33061253
24. Brölmann H, Bongers M, Garza-Leal JG, et al. The FAST-EU trial: 12-month clinical outcomes of women after intrauterine sonography-guided transcervical radiofrequency ablation of uterine fibroids. *Gynecol Surg.* 2016; 13: 27-35. PMID 26918001
25. Shifrin G, Engelhardt M, Gee P, et al. Transcervical fibroid ablation with the Sonata™ system for treatment of submucous and large uterine fibroids. *Int J Gynaecol Obstet.* Oct 2021; 155(1): 79-85. PMID 33544889
26. Christoffel L, Römer T, Schiermeier S. Transcervical Radiofrequency Ablation of Uterine Fibroids Global Registry (SAGE): Study Protocol and Preliminary Results. *Med Devices (Auckl).* 2021; 14: 77-84. PMID 33688276
27. Keltz J, Levie M, Chudnoff S. Pregnancy Outcomes After Direct Uterine Myoma Thermal Ablation: Review of the Literature. *J Minim Invasive Gynecol.* 2017; 24(4): 538-545. PMID 28109894
28. Polin M, Hur HC. Radiofrequency Ablation of Uterine Myomas and Pregnancy Outcomes: An Updated Review of the Literature. *J Minim Invasive Gynecol.* Jun 2022; 29(6): 709-715. PMID 35123041
29. Berman JM, Shashoua A, Olson C, et al. Case Series of Reproductive Outcomes after Laparoscopic Radiofrequency Ablation of Symptomatic Myomas. *J Minim Invasive Gynecol.* 2020; 27(3): 639-645. PMID 31238151
30. Christoffel L, Bends R, Toub D, et al. Pregnancy Outcomes After Transcervical Radiofrequency Ablation of Uterine Fibroids with the Sonata System. *J Gynecol Surg.* Jun 01 2022; 38(3): 207-213. PMID 35785107
31. Hansen-Lindner L, Schmid-Lossberg J, Toub D. Transcervical Fibroid Ablation (TFA): Update on Pregnancy Outcomes. *J Clin Med.* May 14 2024; 13(10). PMID 38792434
32. Allen A, Schembri M, Parvataneni R, et al. Pregnancy Outcomes After Laparoscopic Radiofrequency Ablation of Uterine Leiomyomas Compared With Myomectomy. *Obstet Gynecol.* May 01 2024; 143(5): 612-618. PMID 38422502
33. Goldfarb HA. Bipolar laparoscopic needles for myoma coagulation. *J Am Assoc Gynecol Laparosc.* Feb 1995; 2(2): 175-9. PMID 9050553
34. Goldfarb HA. Nd:YAG laser laparoscopic coagulation of symptomatic myomas. *J Reprod Med.* Jul 1992; 37(7): 636-8. PMID 1387912
35. Nisolle M, Smets M, Malvaux V, et al. Laparoscopic myolysis with the Nd:YAG laser. *J Gynecol Surg.* 1993; 9(2): 95-9. PMID 10171973
36. Donnez J, Squifflet J, Polet R, et al. Laparoscopic myolysis. *Hum Reprod Update.* 2000; 6(6): 609-13. PMID 11129695
37. Phillips DR, Nathanson HG, Milim SJ, et al. Laparoscopic Leiomyoma Coagulation. *J Am Assoc Gynecol Laparosc.* Aug 1996; 3(4, Supplement): S39. PMID 9074213
38. Zreik TG, Rutherford TJ, Palter SF, et al. Cryomyolysis, a new procedure for the conservative treatment of uterine fibroids. *J Am Assoc Gynecol Laparosc.* Feb 1998; 5(1): 33-8. PMID 9454874

39. Zupi E, Piredda A, Marconi D, et al. Directed laparoscopic cryomyolysis: a possible alternative to myomectomy and/or hysterectomy for symptomatic leiomyomas. *Am J Obstet Gynecol.* Mar 2004; 190(3): 639-43. PMID 15041993
40. Zupi E, Marconi D, Sbracia M, et al. Directed laparoscopic cryomyolysis for symptomatic leiomyomata: one-year follow up. *J Minim Invasive Gynecol.* 2005; 12(4): 343-6. PMID 16036195
41. Hindley JT, Law PA, Hickey M, et al. Clinical outcomes following percutaneous magnetic resonance image guided laser ablation of symptomatic uterine fibroids. *Hum Reprod.* Oct 2002; 17(10): 2737-41. PMID 12351555
42. National Institute for Health and Care Excellence (NICE). Interventional procedures guidance: Transcervical ultrasound-guided radiofrequency ablation for symptomatic uterine fibroids [IPG689]. March 31, 2021; <https://www.nice.org.uk/guidance/ipg689>. Accessed on December 17, 2024.