



Hysteroscopic myomectomy using a mechanical approach

➔ Compared with resectoscopy, the mechanical approach offers improved visualization and requires fewer insertions of the hysteroscope, shortening operative time

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Uterine fibroids are a common complaint in gynecology, with an incidence of approximately 30% in women aged 25 to 45 years and a cumulative incidence of 70% to 80% by age 50.^{1,2} They are more prevalent in women of African descent and are a leading indication for hysterectomy.

Although they can be asymptomatic, submucosal fibroids are frequently associated with:

- abnormal uterine bleeding (AUB)
- dysmenorrhea
- expulsion of an intrauterine device (IUD)
- leukorrhea



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- pelvic pain
- urinary frequency
- infertility
- premature labor
- reproductive wastage
- bleeding during hormone replacement therapy.

In postmenopausal women, the risk of malignancy in a leiomyoma ranges from 0.2% to 0.5%.¹ The risk is lower in premenopausal women.

In this article, I describe the technique for hysteroscopic myomectomy using a mechanical approach (Truclear Tissue Removal System, Smith & Nephew, Andover, MA), which offers hysteroscopic morcellation as well as quick resection and efficient fluid management. (Note: Unlike open intraperitoneal morcellation, hysteroscopic morcellation carries a low risk of tissue spread.)

Classification of fibroids

Preoperative classification of leiomyomas makes it possible to determine the best route for surgery. The most commonly used classification system was developed by the European Society of Gynaecological Endoscopy (ESGE) (FIGURE 1, page 26), which considers the extent of intramural extension. Each fibroid under that system is classified as:

- **Type 0** – no intramural extension
- **Type I** – less than 50% extension
- **Type II** – more than 50% extension.

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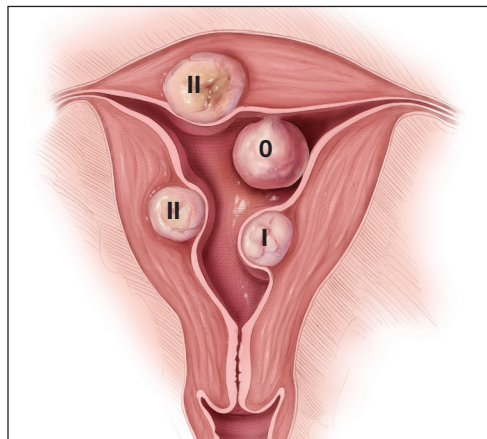
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FIGURE 1 Classification of uterine fibroids, ESGE system



According to the European Society of Gynaecological Endoscopy system, which considers intramural extension in its categorization, Type 0 myomas have no extension, Type I have less than 50%, and Type II have more than 50%.

A second classification system recently was devised to take into account additional features of the fibroid. The STEP-W classification considers size, topography, extension, penetration, and the lateral wall

(FIGURE 2). In general, the lower the score, the less complex the procedure will be, with a lower risk of fluid intravasation, shorter operative time, and a greater likelihood of complete removal of the fibroid.

A multicenter, prospective study of 449 women who underwent hysteroscopic resection of their fibroids correlated the ESGE and STEP-W systems. All 320 fibroids (100%) with a score of 4 or below on the STEP-W classification system were completely removed, compared with 112 of 145 fibroids (77.2%) with a score greater than 4. All 33 cases of incomplete hysteroscopic resection (100%) had a STEP-W score above 4.³

In the same study, 85 of 86 cases (98.9%) with Type 0 fibroids under the ESGE system had complete resection, along with 278 of 298 Type I fibroids (93.3%), and 69 of 81 Type II fibroids (85.2%).³ Complete removal is a goal because it relieves symptoms and averts the need for additional procedures.

Patient selection

Proper patient selection for hysteroscopic myomectomy is extremely important. The

FIGURE 2 Classification of uterine fibroids, STEP-W system

Size of the nodule—specifically, whether it is <2 cm, 2–5 cm, or >5 cm

Topography

The extension of the base of the nodule with respect to the wall of the uterus

Degree of penetration of the myoma into myometrium

When the myoma is on the lateral wall, add an extra point

○ = Score 0
● = Score 1
● = Score 2

How to score a myoma using the STEP-W Classification		
Total score	Group	Suggested treatment
0–4	I	Low-complexity hysteroscopic myomectomy
5–6	II	Complex hysteroscopic myomectomy. Consider giving a preoperative GnRH analog or performing a two-stage procedure, or both.
7–9	III	Hysteroscopic approach is not recommended

GnRH = gonadotropin-releasing hormone

A score of 4 or less is desired for low-complexity hysteroscopic myomectomy.

ILLUSTRATIONS: COURTESY OF AMY GARCIA, MD

most common indications are AUB, pelvic pain or discomfort, recurrent pregnancy loss, and infertility. In addition, the patient should have a strong wish for uterine preservation and desire a minimally invasive transcervical approach.

AAGL guidelines on the diagnosis and management of submucous fibroids note that, in general, submucous leiomyomas as large as 4 or 5 cm in diameter can be removed hysteroscopically by experienced surgeons.⁴

A hysteroscopic approach is not advised for women in whom hysteroscopic surgery is contraindicated, such as women with intrauterine pregnancy, active pelvic infection, active herpes infection, or cervical or uterine cancer. Women who have medical comorbidities such as coronary heart disease, significant renal disease, or bleeding diathesis may need perioperative clearance from anesthesia or hematology prior to hysteroscopic surgery and close fluid monitoring during the procedure.

Consider the leiomyoma

Penetration into the myometrium. Women who have a fibroid that penetrates more than 50% into the myometrium may benefit from hysteroscopic myomectomy, provided the surgeon is highly experienced. A skilled hysteroscopist can ensure complete enucleation of a penetrating fibroid in these cases.

If you are still in the learning process for hysteroscopy, however, start with easier cases—ie, polyps and Type 0 and Type I fibroids. Type II fibroids require longer operative time, are associated with increased fluid absorption and intravasation, carry an increased risk of perioperative complications, and may not always be completely resected.

Size of the fibroid also is relevant. As size increases, so does the volume of tissue needing to be removed, adding to overall operative time.

Presence of other fibroids. When a woman has an intracavitary fibroid as well as myomas in other locations, the surgeon should consider whether hysteroscopic removal of the intracavitary lesion alone can provide

Best practices for hysteroscopic myomectomy

- Careful preoperative evaluation is important, preferably using diagnostic hysteroscopy or saline infusion sonography, to choose the optimal route of myomectomy and plan the surgical approach.
- During the myomectomy, pay close attention to fluid management and adhere strictly to predetermined limits.
- Complete removal of the fibroid is essential to relieve symptoms and avert the need for additional procedures.

significant relief of all fibroid-related symptoms. In such cases, laparoscopic, robotic, or abdominal myomectomy may be preferable, especially if the volume of the additional myomas is considerable.

To determine the optimal surgical route, the physician must consider the symptoms present—is AUB the only symptom, or are other fibroid-related conditions present as well, such as bulk, pelvic pain, and other quality-of-life issues? If multiple symptoms exist, then other approaches may be better.

How fibroids affect fertility

Fibroids are present in 5% to 10% of women with infertility. In this population, fibroids are the only abnormal finding in 1.0% to 2.4% of cases.⁴

In a meta-analysis of 23 studies evaluating women with fibroids and infertility, Pritts and colleagues found nine studies involving submucosal fibroids.⁵ These studies included one randomized controlled trial, two prospective studies, and six retrospective analyses. They found that women who had fibroids with a submucosal component had lower pregnancy and implantation rates, compared with their infertile, myoma-free counterparts. Pritts and colleagues concluded that myomectomy is likely to improve fertility in these cases (TABLE, page 28).⁵

Instrumentation

Among the options are monopolar and bipolar resectoscopy and the mechanical approach using the Truclear System, which includes a morcellator. With conventional resectoscopy all chips must be removed,



Considerable experience is necessary to successfully remove a fibroid that penetrates more than 50% into the myometrium



How submucous fibroids affect fertility

Outcome	Number of studies or substudies	Relative risk	95% confidence interval	P value
Clinical pregnancy	4	0.363	0.179–0.737	.005
Implantation	2	0.283	0.123–0.649	.003
Ongoing pregnancy/live birth	2	0.318	0.119–0.850	<.001
Spontaneous abortion	2	1.678	1.373–2.051	.022
Preterm delivery	0	—	—	—

SOURCE: Adapted from Pritts et al⁴

necessitating multiple insertions of the hysteroscope. Monopolar instrumentation, in particular, carries a risk of energy discharge to healthy tissue. The monopolar resectoscope also has a longer learning curve, compared with the mechanical approach.⁶

In contrast, the Truclear System requires fewer insertions, has a short learning curve, and omits the need for capture of individual chips, as the mechanical morcellator suctions and captures them throughout the procedure.⁷ In addition, because resection is performed mechanically, there is no risk of energy discharge to healthy tissue.

The Truclear system also is associated with a significantly shorter operative time, compared with resectoscopy, which may be advantageous for residents, fellows, and other physicians learning the procedure (FIGURE 3, page 30).⁷ Shorter operative time also may result in lower fluid deficits. In addition, saline distension may reduce the risk of fluid absorption and hyponatremia. The tissue-capture feature allows evaluation of the entire pathologic specimen.

Besides hysteroscopic myomectomy, the Truclear System is appropriate for visual dilatation and curettage (D&C), adhesiolysis, polypectomy, and evacuation of retained products of conception.

Preoperative evaluation

A complete history is vital to document which fibroid-related symptoms are present and how they affect quality of life.

Preoperative imaging also is imperative—using either 2D or 3D saline infusion

sonography or a combination of diagnostic hysteroscopy and transvaginal ultrasound—to select patients for hysteroscopy, anticipate blood loss, and ensure that the proper instrumentation is available at the time of surgery. Magnetic resonance imaging, computed tomography, and hysterosalpingography are either prohibitively expensive or of limited value in the initial preoperative assessment of uterine fibroids.

Any woman who has AUB and a risk for endometrial hyperplasia or cancer should undergo endometrial assessment as well.

Use of preoperative medications

In most cases, prophylactic administration of **antibiotics** is not warranted to prevent infection or endocarditis.

Although some clinicians give **gonadotropin-releasing hormone (GnRH) agonists** to reduce the size of large fibroids, the drug complicates dissection of the fibroid from the surrounding capsule. For this reason, and because we lack data demonstrating that GnRH agonists decrease blood loss and limit absorption of distension media, I do not administer them to patients.^{8–12} Moreover, this drug can cause vasomotor symptoms, cervical stenosis, and vaginal hemorrhage (related to estrogen flare).

GnRH agonists may be of value to stimulate transient amenorrhea for several months preoperatively in order to correct iron-deficiency anemia. Intravenous iron also can be administered during this interval.

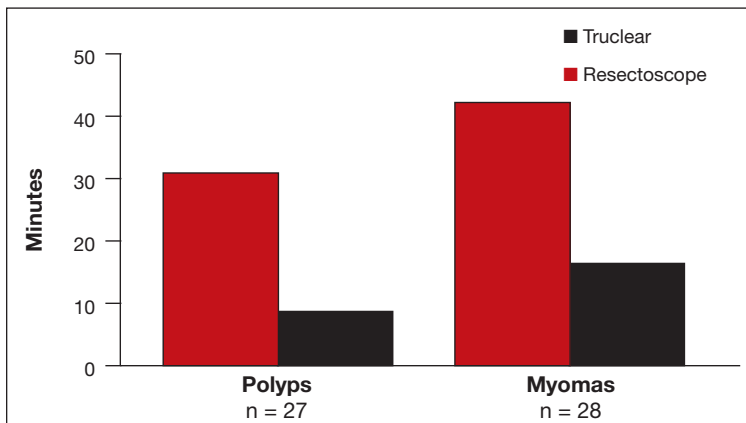
The risk of bleeding in hysteroscopic myomectomy is 2% to 3%.¹ When the mechanical approach is used, rather than



GnRH agonists complicate dissection of the fibroid from the surrounding capsule and are rarely indicated prior to hysteroscopic myomectomy



FIGURE 3 Operative time, Truclear versus resectoscopy



The Truclear approach involved significantly shorter operative time for both polypectomy and myomectomy.

FAST TRACK

Always notify the anesthesiologist before administering vasopressin

resectoscopy, continuous flow coupled with suctioning of the chips during the procedure keeps the image clear. Post-procedure contraction of the uterus stops most bleeding. Intrauterine pressure of the pump can be increased to help tamponade any oozing.

Misoprostol. Cervical stenosis is not uncommon in menopausal women. It can also pose a challenge in nulliparous women. Attempting hysteroscopy in the setting of cervical stenosis increases the risk of cervical laceration, creation of a false passage, and uterine perforation. For this reason, I prescribe oral or vaginal misoprostol 200 to 400 µg nightly for 1 to 2 days before the procedure.

Vasopressin can reduce blood loss during hysteroscopic myomectomy when it is injected into the cervical stroma preoperatively. It also reduces absorption of distension fluid and facilitates cervical dilation.

However, vasopressin must be injected with extreme care, with aspiration to confirm the absence of blood prior to each injection, as intravascular injection can lead to bradycardia, profound hypertension, and even death.¹³ Always notify the anesthesiologist prior to injection when vasopressin will be administered.

I routinely use vasopressin before hysteroscopic myomectomy (0.5 mg in 20 cc of

saline or 20 U in 100 cc), injecting 5 cc of the solution at 3, 6, 9, and 12 o'clock positions.

Anesthesia during hysteroscopic myomectomy typically is “monitored anesthesia care,” or MAC, which consists of local anesthesia with sedation and analgesia. The need for regional or general anesthesia is rare. Consider adding a pericervical block or intravenous ketorolac (Toradol) to provide postoperative analgesia.

Surgical technique

Strict attention to fluid management is required throughout the procedure, preferably in accordance with AAGL guidelines on the management of hysteroscopic distending media.¹⁴ With the mechanical approach, because the distension fluid is isotonic (normal saline), it does not increase the risk of hyponatremia but can cause pulmonary edema or congestive heart failure. Intravasation usually is the result of excessive operative time, treatment of deeper myometrial fibroids (Type I or II), or high intrauterine pressure. I operate using intrauterine pressure in the range of 75 to 125 mm Hg.

The steps involved in the mechanical hysteroscopy approach are:

- **Insert the hysteroscope** into the uterus under direct visualization. In general, the greater the number of insertions, the greater the risk of uterine perforation. Preoperative cervical ripening helps facilitate insertion (see “Misoprostol” on this page).
- **Distend the uterus** with saline and inspect the uterine cavity, noting again the size and location of the fibroids and whether they are sessile or pedunculated.
- **Locate the fibroid** or other pathology to be removed, and place the morcellator window against it to begin cutting. Use the tip of the morcellator to elevate the fibroid for easier cutting. Enucleation is accomplished largely by varying the intrauterine pressure, which permits uterine decompression and myometrial contraction and renders the fibroid capsule more visible. If necessary, the hysteroscope can be withdrawn to stimulate myometrial

contraction, which also helps to delineate the fibroid capsule.

- **Reinspect the uterus** to rule out perforation and remove any additional intrauterine pathology with a targeted view.
- Once all designated fibroids have been removed, **withdraw the morcellator and hysteroscope** from the uterus.
- Inspect the endocervical landscape to rule out injury and other pathology.

Postoperative care

A nonsteroidal anti-inflammatory drug or limited use of narcotics usually is sufficient to relieve any postoperative cramping or vaginal discomfort.

Advise the patient to notify you in the event of increasing pain, foul-smelling vaginal discharge, or fever.

Also counsel her that she can return to most normal activities within 24 to 48 hours. Sexual activity is permissible 1 week after surgery. Early and frequent ambulation is important.

Schedule a follow-up visit 4 to 6 weeks after the procedure. 📅

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