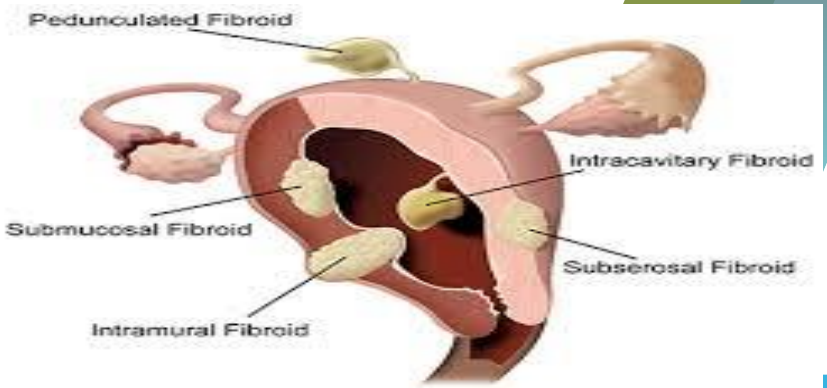
TEHRAN UNIVERSITY OF MEDICAL SCIENCES

جمهوری اسلامی ایران

Surgical Treatment of Myoma



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Uterine leiomyomas (myomas or fibroids) are smooth muscle tumors and are the most common type of pelvic tumors in women.

Myomectomy is removal of the myomas, while leaving the uterus in place.

Abdominal Myomectomy

There are many management options for fibroid-related symptoms,

- ✓ expectant management,
- ✓ medical therapy,
- ✓ nonexcisional procedures (endometrial ablation, uterine artery embolization, magnetic resonance guided focused ultrasound), and
- ✓ surgery (myomectomy, radiofrequency ablation, hysterectomy).

Myomectomy is the surgical removal of leiomyomas from The uterus, leaving the uterus in place.

- Abdominal,
- Laparoscopic,
- Hysteroscopic,
- Vaginal approach.

Appropriate candidates for open abdominal myomectomy are patients with the following characteristics:

- Symptomatic uterine fibroid(s)
- Hysteroscopic or laparoscopic myomectomy is not feasible
- A laparotomy is required to treat intraabdominal pathology other than leiomyomas

Indications:

The most common indications for open abdominal myomectomy are:

- Abnormal uterine bleeding
- Bulk-related symptoms – pelvic/abdominal pain or pressure; pressure on the urinary or gastrointestinal tract resulting in urinary (eg, urinary frequency, urinary incontinence, hydronephrosis) or bowel symptoms (eg, constipation)

Unproven indications

1-Evaluation of pelvic malignancy

For patients in whom a leiomyomatous uterus makes it difficult to evaluate the adnexa, pelvic imaging should be performed only if symptoms of adnexal disease develop (eg, lower quadrant pelvic pain) or for selected patients who require screening for ovarian cancer.

If sonographic visualization of the ovaries is occluded by myomas, magnetic resonance imaging should be performed.

- exclusion of uterine sarcoma is not an indication for myomectomy

2-Infertility

- The location of a fibroid, and not its size, is the key factor regarding impact on fertility.

- Leiomyomas that distort the uterine cavity (submucosal or intramural with an intracavitary component) result in difficulty conceiving a pregnancy and an increased risk of miscarriage.

- the role of intramural fibroids is controversial.

- Since open abdominal myomectomy is performed mainly to remove intramural or subserosal myomas, its role in patients with infertility is uncertain.

3-Prevention of obstetric complications

Myomectomy may be appropriate for selected patients with a history of obstetric complications that appear related to the presence of leiomyomas

Myomectomy Versus Other Treatment Approaches

- **Abnormal uterine bleeding**
- **Bulk-related symptoms**
- **Patients who desire future pregnancy**

Myomectomy is the procedure of choice for patients who desire future fertility.

Laparoscopic myomectomy is a minimally invasive approach that is appropriate for selected patients

Myomectomy versus hysterectomy

patients with symptomatic fibroids who have completed childbearing have been counseled to undergo hysterectomy, but this approach is not supported by evidence or current practice.

The rationale for counseling patients to undergo hysterectomy has been based upon two presumed benefits:

- hysterectomy eliminates the risk of future cervical or uterine pathology and
- hysterectomy has been thought to be associated with less blood loss and fewer complications than myomectomy.

Some factors that may affect a patient's decision include:

- Hysterectomy offers the advantage of definitive treatment.
- Some patients prefer myomectomy because they wish to conserve their uterus.
- Studies show a higher risk of injury to ureters, bladder and bowel with hysterectomy
- Hysterectomy is associated with a risk of subsequent pelvic organ prolapse surgery.
- Hysterectomy (with ovarian conservation) is associated with decreased anti-müllerian hormone levels and may cause some patients to enter menopause two to three years earlier than normal

PREOPERATIVE EVALUATION

- ✓ **Informed consent**
- ✓ **History**
- ✓ **Pelvic examination**
- ✓ **Imaging**

- Imaging with ultrasonography rather than other modalities is sufficient for patients in whom open myomectomy is planned.
- Ultrasound can confirm the presence of leiomyomas and their approximate number and location
- Magnetic resonance imaging (MRI) is typically not necessary prior to open myomectomy, with the exception of patients in whom leiomyomas must be differentiated from uterine sarcoma or adenomyosis

✓ **Laboratory evaluation**

- A baseline complete blood count
- a blood sample to the blood bank in case there is a need for transfusion.

✓ **Other testing**

- Prior to myomectomy, endometrial sampling should be performed in all patients with bleeding symptoms, particularly intermenstrual bleeding, older than 35 years or who have risk factors for endometrial cancer

Preoperative Preparation

Preparing for potential blood loss

- Correction of anemia
- Autologous blood donation may reduce the likelihood of receiving a blood transfusion.

❑ **Reducing uterine size with GnRH agonists**

❑ **Prophylactic antibiotics**

✓ clean procedure

✓ antibiotics are not required

✓ we give prophylactic antibiotics for open abdominal myomectomy

❑ **Thromboprophylaxis**

✓ at least at moderate risk for venous thromboembolism and require appropriate thromboprophylaxis, whether mechanical or pharmacologic.

✓ We use sequential compression devices during surgery and for two days following surgery for all patients

❑ **Anesthesia**

✓ is typically performed under general anesthesia, but regional anesthesia may be used.

PROCEDURE

- **Apply measures to reduce blood loss**
- **Make uterine incision(s)**
  - ✓ Transverse
  - ✓ vertical, to prevent transection of the arcuate arteries of the uterus, which run transversely
  - ✓ Anterior uterine incisions are associated with fewer adnexal adhesions than posterior incisions
  - ✓ there are no data regarding the number of incisions and the risk of adhesions

❑ **Remove myomas**

❑ **Close uterine defects**

- ✓ If the myometrial defect is deep (>2 cm), two layers may be needed to reapproximate the tissue and achieve hemostasis
- ✓ In our practice, we use a size 0 polyglactin 910 (Vicryl) suture for the myometrium.
- ✓ The serosa is closed with a running suture; we use size 2-0 polydioxanone (PDS), but any absorbable suture may be used.

Operative challenges

❑**Submucosal myomas**

we repair the myometrium at the interface with the cavity, taking care to **avoid entry** of suture into the cavity, since this may cause a foreign body reaction and adhesions.

Operative challenges

- **Cervical or broad ligament myomas**

These lesions are often proximal to vital structures such as the ureter or major pelvic vessels.

Sharp dissection, especially where the tips of the instrument cannot be seen, should be avoided.

Closure of the defect should also be carefully planned after identification of the ureter and uterine vessels, in order to avoid injury or ligation of the ureter or injury to vessels. If necessary, ligation of the uterine vessels may be performed to avoid bleeding.

COMPLICATIONS

❑ Hemorrhage

The average volume of blood loss for open abdominal myomectomy varies across studies from approximately **200 to 800 mL**

Increasing size and number of myomas, as well as entering the uterine cavity, are associated with increased blood loss.

❑ Conversion to hysterectomy

Approximately **1 to 4 percent** of open myomectomies are converted to hysterectomy

COMPLICATIONS

❑ **Fever and infection**

within **48 hours** after surgery in approximately **12 to 67 percent** of patients

Proposed mechanisms for unexplained postmyomectomy fever include factors at the evacuated myoma sites: **hematomas or release of inflammatory mediators**

❑ **Adhesive disease**

posterior location of a removed myoma and the presence of sutures

❑ **Other complications**

Visceral injury is uncommon during open abdominal myomectomy

INPATIENT POSTOPERATIVE CARE

- We use a continuous infusion of bupivacaine via catheters placed above and below the fascia at the time of wound closure. The pump lasts approximately four days, at which time the catheters are removed. Postoperative pain management initially with parenteral administration of analgesics.

INPATIENT POSTOPERATIVE CARE

This is transitioned to the oral route when a patient can tolerate oral intake.

. Removal of the bladder catheter during the first 24 hours postoperatively.

. Early feeding of a regular diet.

. Ambulation

FOLLOW-UP

- ✓ there are **no** medical restrictions on **sexual activity.**
- ✓ Patients may **return to work as soon as** they have regained sufficient stamina and mobility
- ✓ We see patients for a follow-up visit at **two weeks** postoperatively

OUTCOME

Relief of symptoms

Myomectomy has been reported to relieve symptoms in **80 percent** of patients

Persistent or new myomas

- ✓ most of these patients will **not require additional treatment** for fibroid-related symptoms
- ✓ **Five to 10 years** after myomectomy, **27 to 62 percent** of patients will have myomas detected by **ultrasound**
- ✓ Postmyomectomy myomas are more likely in patients who have **multiple versus single myomas** at time of surgery (74 versus 11 percent in one study)
- ✓ and those who do not versus do have a **pregnancy** after myomectomy (30 versus 15 percent in one study).
- ✓ Preoperative use of GnRH agonists is associated with an increase in the risk of postoperative myomas

CONCEPTION AND PREGNANCY AFTER MYOMECTOMY

- **Interval to conception**

three to six months

- **Infertility**

Early assesment

- **Uterine rupture during pregnancy following myomectomy**

Increased risk

PREOPERATIVE MEASURES

Correction of anemia

- A preoperative hemoglobin of ≤10 g/dL was associated with a threefold or higher increase in serious perioperative morbidity (cardiac events, respiratory failure, or serious bacterial infection) or mortality
- iron supplementation

1 to 2 g in as little as one week

- **GnRH agonists**

Preoperative GnRH agonist therapy resulted in a small, but statistically significant, increase in reoperative hemoglobin (1.0 g/dL higher)

there was no significant decrease in the risk of blood transfusion in women treated with GnRH

GnRH agonists may increase the risk of persistent myomas

- There is no evidence that use of GnRH agonists prior to myomectomy reduces the risk of blood transfusion and such use may increase operative difficulty and the risk of myoma persistence/recurrence.

- The primary advantage of use of these agents is the ability to use a more favorable laparotomy incision or, potentially, to use a laparoscopic

INTRAOPERATIVE MEASURES

Pharmacologic interventions

Safe use of vasopressin

- With rare cases of bradycardia, cardiovascular collapse, and death
- Vasopressin use may be contraindicated in women with medical comorbidities (eg, cardiovascular, vascular, or renal disease).
- The use of vasopressin to decrease blood loss during myomectomy has not been approved by the us food and drug administration.
- Avoid intravascular injection
- The surgeon should pull back on the plunger of the syringe to check for blood
- The maximal safe dose of vasopressin is not well established
- We dilute 20 units of vasopressin in 100 ml of saline; 4 to 6 units of vasopressin equals 20 to 30 ml of this solution.
- The half-life of intramuscular vasopressin is 10 to 20 minutes and the duration of action is two to eight hours
- Blood loss was significantly lower with combined use of vasopressin/loop ligation compared with vasopressin alone

- Epinephrine is another vasoconstrictor that is effective in reducing blood loss during myomectomy

- Injection of bupivacaine with epinephrine (50 ml bupivacaine hydrochloride 0.25 percent and 0.5 ml of 1 mg/ml epinephrine)

Uterotonics

use of vaginal misoprostol (400 mcg, one hour before surgery) compared with placebo significantly reduced blood loss (149 mL less).

oxytocin does **not** reduce blood loss compared with physiologic serum

Tranexamic acid

Estimate blood loss was less (-284 mL) with tranexamic acid, but

need for transfusion and postoperative hemoglobin was not significantly different between groups

we use tranexamic acid (10 mg per kg infused over 10 minutes) starting at the beginning of surgery.

Tourniquets and clamps

A significant decrease in blood loss (an average of 1870 mL less).

- Palpate the broad ligament just above the level of the internal cervical os to identify a space that is free of vessels and the ureter.
- Make a 1 cm incision in this clear space bilaterally.
- Pass the tourniquet (eg, a Penrose drain [or a latex-free tourniquet in a latex-allergic patient]) through the incisions with the ends protruding anteriorly.
- Pull the tourniquet tight and secure by securing the ends with a Kelley clamp. Take care to avoid enlarging the broad ligament incisions or damaging surrounding structures.

Autologous blood transfusion

1-Autologous blood donation

Some surgeons advise patients to bank autologous blood, but this should be done only by patients with an appropriate hematocrit and sufficient time before surgery to avoid anemia at the time of surgery.

2-intraoperative or postoperative blood salvage, and acute normovolemic (isovolemic) hemodilution.

Blood loss (≥300 mL) is anticipated, we use intraoperative blood salvage

CLINICAL APPROACH

for all women undergoing myomectomy, we do the following:

- Correct preoperative anemia.
- Inject vasopressin before each uterine incision.
- Many surgeons apply a uterine artery tourniquet (for open myomectomy only) and ovarian artery clamps in all patients.
- In our practice, we reserve the use of tourniquets and clamps for women with large fibroids.

Laparoscopic techniques

INTRODUCTION

Laparoscopic techniques provide minimally invasive options for many gynecologic procedures.

Myomectomy, the removal of uterine leiomyomas (myomas or fibroids), can be performed laparoscopically in selected patients.

Other laparoscopic procedures have been developed for leiomyoma treatment, including **uterine artery occlusion and myolysis**, but these are not commonly used.

Laparoscopic myomectomy

- ✓ **is** primarily used to remove intramural or subserosal leiomyomas
- ✓ Patients with **both** submucosal and intramural/ subserosal myomas may be candidates for **concomitant** laparoscopic and hysteroscopic myomectomy

Indications

- ❑Abnormal uterine bleeding.
- ❑Bulk-related symptoms
  pelvic/abdominal pain or pressure; pressure on the urinary or gastrointestinal tract resulting in urinary (eg, urinary frequency, urinary incontinence, hydronephrosis) or bowel symptoms (eg, constipation).

Contraindications

Laparoscopic myomectomy is contraindicated in patients in whom laparoscopy or uterine conservation are contraindicated (eg, **medical comorbidities, cervical or uterine cancer**).

Choosing the surgical approach for myomectomy

Laparoscopic myomectomy offers several advantages compared with abdominal myomectomy

- decreased morbidity and
- a shorter recovery.

- **Robot**-assisted myomectomy has similar outcomes to laparoscopic myomectomy, with **longer operating times and higher costs**.

Candidates for laparoscopic myomectomy

- ❑ Depends on the location, size, and number of leiomyomas,
- ❑ Although parameters for these vary with surgical expertise
- ❑ Important factors regarding the location of fibroids include
  - ✓ The depth of penetration into the myometrium
  - ✓ Position relative to important structures (eg, uterine vessels, fallopian tubes)

study of 2050 patients undergoing laparoscopic myomectomy

- size of myoma >5 cm
- >3 myomas removed
- intraligamentous location
- intramural myomas

were significantly associated with an increase in minor, but not major, complications (eg, fever, uterine manipulator injuries).

In summary

- ✓ laparoscopic myomectomy is a minimally invasive procedure with a **shorter recovery** and a **lower overall risk** of complications than abdominal myomectomy.

- ✓ More data are needed about the comparative risks of major complications and fibroid persistence or recurrence.

- ✓ Patient eligibility and access to trained surgeons limit the availability of this procedure.

Alternative laparoscopic techniques

Robot-assisted laparoscopy

- ✓ Laparoscopic suturing may be easier than with conventional laparoscopy
- ✓ blood loss appears to be less
- ✓ recovery time faster than with open procedures

PREOPERATIVE EVALUATION AND PREPARATION

- ✓ Alternative medical, interventional radiology, and surgical options for treatment
- ✓ Potential complications of the procedure, including conversion to laparotomy and the likelihood of recurrence of fibroid-associated symptoms should also be reviewed.
- ✓ Risk of malignancy
- ✓ Risks and benefits of power morcellation.

Imaging

Pelvic sonography is typically the initial imaging study.

MRI is also the best modality to diagnose adenomyosis

MRI is also indicated if uterine sarcoma is suspected.

GnRH agonists

- Reduces the size of myomas and
- May theoretically allow a laparoscopic rather than abdominal approach in some patients

  Disadvantages of these agents

- may make removal of myomas more difficult and
- may increase the risk of persistent myomas

Thromboprophylaxis

Patients undergoing laparoscopic myomectomy (major surgery, defined as >30 minutes duration) are at **low to moderate risk** for venous thromboembolism and **require** appropriate thromboprophylaxis

Prophylactic antibiotics

Antibiotic prophylaxis is typically **not** administered for laparoscopic procedures

Anesthesia

Laparoscopic myomectomy requires **general** anesthesia

PROCEDURE

❑**Insert laparoscopic ports**

✓ position and

✓ size of the myomas

❑**Apply measures to reduce blood loss**

✓ To control bleeding from large vessels within a myometrial defect, we desiccate briefly with **bipolar** electrosurgical paddles.

✓ **Excessive desiccation** devascularizes the myometrium and should be avoided, since it may increase the risk of uterine rupture in subsequent pregnancy

PROCEDURE

❑**Make uterine incision(s),**

✓ transverse

❑**Remove myomas**

uterine morcellation

❑ **Close uterine defects**

✓ Delayed absorbable sutures are placed in one, two or three layers

✓ size 0 polydioxanone (eg, PDS)

✓ Polyglactin (Vicryl) or barbed suture

COMPLICATIONS

❑ **Hemorrhage**

✓ In series of 500 or more laparoscopic myomectomies, the rate of hemorrhage or blood transfusion varied widely from **0.1 to 6** percent.

✓ The average blood loss reported was 80 to 248 mL (range 20 to 1000 mL)

❑ **Fever and infection**

❑ **Bowel or bladder injury**

Visceral injury during laparoscopic myomectomy is **rare**.

In series of 500 or more laparoscopic myomectomies, the rate of bowel injury was **0 to 0.04** and of bladder injury was **0 to 0.3** percent

COMPLICATIONS

❑ **Conversion to laparotomy**

Conversion to laparotomy occurs in **1 to 2 percent** of laparoscopic myomectomy procedures.

❑ **Adhesive disease**

Adhesion formation after myomectomy has been well documented. Studies in which second look laparoscopy has been performed following laparoscopic myomectomy have reported intraabdominal adhesions in **36 to 66 percent** of patients

OUTCOME

Relief of symptoms , No data

Persistent or new myomas — In a multicenter retrospective cohort study of 512 patients who underwent laparoscopic myomectomy, the rates of postmyomectomy myomas at five and eight years were **53 and 84 percent**;

however, the rates of reoperation were much lower, **7 and 16 .**

Risk factors for the presence of leiomyomas were similar to those for open myomectomy, including: **multiple myomas at time of surgery, uterine size ≥13 weeks, and age <36 years**.

FOLLOW-UP

- ✓ Patients are encouraged to resume their normal daily activities as **quickly** as is comfortable.
- ✓ Decisions regarding resumption of vaginal intercourse are **made by the patient**; there are no medical restrictions on sexual activity

CONCEPTION AND PREGNANCY AFTER MYOMECTOMY

Interval to conception

- ✓ several months
- ✓ A Japanese study that used **MRI** reported that uterine myometrial healing was complete and blood flow to the area of hysterotomy was normal **three months** after surgery

Fertility

If a patient is having difficulty conceiving following a myomectomy, **early assessment** of the uterine cavity and fallopian tubes with a hysterosalpingogram is advisable

CONCEPTION AND PREGNANCY AFTER MYOMECTOMY

Uterine rupture during pregnancy following myomectomy

Myomectomy is associated with an increased risk of uterine rupture during subsequent pregnancy.

- ✓ Failure to adequately suture myometrial defects,
- ✓ Lack of hemostasis within uterine defects with subsequent hematoma formation,
- ✓ The excessive use of electrosurgery with devascularization of the myometrium

Study

2050 patients…..42months ….386 pregnancies ….1 rupture

Other study… 19 rupture:

- ✓ In seven cases the uterine defect was not repaired;
- ✓ in three cases, it was repaired with a single suture;
- ✓ in four cases, it was repaired in only one layer;
- ✓ in one case, only the serosa was closed.
- ✓ A multi-layered closure was employed in only three cases.
- ✓ In 16 of the 19 cases, primarily monopolar or bipolar energy was used for hemostasis, which could lead to devascularization of the myometrium.
- ✓ limited use of electrosurgery and use of multi-layered closure of myometrium.

Many experts advise cesarean delivery as a conservative approach. However, patients who have had myomectomy for pedunculated subserosal or mostly exophytic fibroids (types 5, 6, or 7) might be considered for a trial of labor.

ALTERNATIVE LAPAROSCOPIC TECHNIQUES

Uterine artery occlusion

Myomas may shrink after uterine artery occlusion, but **uterine volume** is **not** reduced to the same extent as myomectomy.

This, combined with the **exposure** of patients to general **anesthesia** and **abdominal incisions** for both procedures, makes myomectomy the preferred procedure.

Uterine artery embolization has been compared with laparoscopic uterine artery occlusion

(1) avoids introduction of foreign bodies (eg, polyvinyl alcohol particles, coils);

(2) provides laparoscopic assessment of the pelvis and abdomen; and

(3) was associated with less postoperative pain in a prospective cohort study of 46 subjects

ALTERNATIVE LAPAROSCOPIC TECHNIQUES

We suggest either laparoscopic myomectomy or uterine artery embolization rather than aparoscopic uterine artery occlusion. Choosing between myomectomy and uterine artery embolization is discussed separately. Use of concurrent laparoscopic myomectomy and uterine artery ligation has been reported

Myolysis

- ✓ Myolysis refers to laparoscopic thermal coagulation or cryoablation (cryomyolysis) of leiomyoma tissue to reduce myoma size (by approximately **50 percent**) by means of myoma destruction and interference with local vascular supply.
- ✓ Laparoscopic myolysis has been performed using a number of energy sources, including **bipolar electrosurgery, Nd:YAG laser, radiofrequency, and cryogenic probes**

Risk of Surgery

- ✓ In patients with **menorrhagia**, myolysis **combined** with endometrial ablation may be more effective therapy than either procedure alone, but this is investigational.
- ✓ An observational study comparing ablation alone versus with the combined procedure found that the risks of a second surgery were 38 and 13 percent, respectively

Hysteroscopic myomectomy

Indications

- Abnormal uterine bleeding
- Recurrent pregnancy loss
- Infertility

Contraindications

- ✓ active pelvic infection, pyometra, intrauterine pregnancy, cervical or uterine cancer
- ✓ Medical comorbidities (eg, coronary heart disease, bleeding diathesis) are also potential contraindications to hysteroscopic surgery

Leiomyoma characteristics

Hysteroscopic myomectomy removes fibroids that have an intracavitary component

- **Type 0** – completely within the endometrial cavity
- **Type I** – extend less than 50 percent into the myometrium
- **Type II** – extend 50 percent or more within the myometrium

The STEP-W classification considers

- ✓ size,
- ✓ topography,
- ✓ extension of the fibroid base,
- ✓ depth of fibroid penetration, and
- ✓ the lateral wall involvement.

- ✓ Each factor is assigned a point value.
- ✓ A low score of 0 to 4 (low complexity) is associated with safety and successful removal of the fibroid in one hysteroscopic setting.
- ✓ A score of 5 or 6 is considered high complexity, and may require a two-stage hysteroscopic procedure.
- ✓ A score of 7 to 9 is considered not amenable to treatment hysteroscopically.

Myometrial penetration

we suggest hysteroscopic myomectomy **only** for fibroids that are completely within the **endometrial cavity** or **extend less than 50 percent** into the myometrium.

Leiomyoma size and number

The definition of large is not well established

Patients with fibroids that were ≤3 cm versus 4 cm or more (10 versus 60 percent)

- ✓ Increasing size of fibroid requires exquisite hysteroscopic skill,
- ✓ complete understanding of fluid management,
- ✓ ability to quickly remove myoma chip fragments that might preclude surgical visualization, and
- ✓ techniques to decrease risk of uterine perforation when chip fragments are removed.

Preoperative Evaluation And Preparation

- ✓ **Informed consent**
- ✓ **History**
- ✓ **Evaluation of the uterus**
  - ❖ We suggest three-dimensional saline infusion sonography, where available
  - ❖ (MRI) defines leiomyoma position well, but is prohibitively expensive to use routinely
  - ❖ For patients with enlarged uterine size (ie, 14 to 16 weeks or larger on pelvic examination), SIS may be impractical
  - ❖ MRI is also used in the STEP-W classification system
- ✓ **Laboratory testing**
  - ❖ hematocrit
  - ❖ pregnancy testing

PERIOPERATIVE MEDICATIONS

✓ Agents to decrease bleeding

1.GnRH agonists

- While many surgeons use these agents, particularly for large fibroids (>3 cm),
- we prefer **not** to use GnRHa,
- they result in **vasomotor symptoms** and may lead to **cervical stenosis** (an antiestrogenic effect) or **profuse vaginal hemorrhage** (due to GnRHa-induced estrogen flare).
- Cases in which we make an exception and use a GNRHa to suppress menses include: patients with severe anemia that may preclude surgery, those in whom intravenous iron therapy is contraindicated, or those who refuse blood products.

2.Vasopressin

- ✓ We routinely use vasopressin prior to hysteroscopic myomectomy; we mix 10 units in 100 mL of normal saline and inject into the cervical stroma in 5 mL aliquots at the 10, 2, 5, and 8 o'clock positions around the ectocervix.
- ✓ This dose can be repeated every 30 to 45 minutes if bleeding is encountered or the procedure is prolonged.
- ✓ An additional benefit of vasopressin is that it facilitates cervical dilation

✓ **Cervical preparation**

misoprostol or laminaria

✓ **Prophylactic antibiotics**

not indicated

✓ **Thromboprophylaxis**

not required

FOLLOW-UP

- ✓ Most patients experience postoperative cramping or light bleeding, and some complain of vaginal discomfort.
- ✓ Acetaminophen or nonsteroidal anti-inflammatory drugs are usually adequate for postoperative pain control, if necessary.
- ✓ The patient may resume most normal activities within **24 hours** and should follow standard postoperative instructions for gynecologic procedures
- ✓ We see patients for a follow-up visit **four to six weeks** postoperatively to assess for further complications and review pathology results

COMPLICATIONS

✓ **Uterine perforation**

is **uncommon**

diagnosed by

- ❖ direct visualization of the defect,
- ❖ or suspected if visualization becomes suddenly difficult (because uterine distension cannot be achieved or visualization is obscured by blood)
- ❖ or if rapid loss of uterine pressure and marked fluid loss occur. Uterine perforation usually results in excessive bleeding, and the evaluation for uterine perforation is discussed as part of the management of bleeding below

COMPLICATIONS

If electrosurgical energy, morcellation, or suction curettage were utilized during the procedure and perforation is suspected, the potential for visceral injury (eg, bowel, bladder) is increased. In such patients, immediate abdominal exploration should be performed.

COMPLICATIONS

✓**Excessive fluid absorption**

in hyponatremia or volume overload. A common reason for termination of a technically difficult procedure is excessive absorption of distension fluid

✓**Excessive bleeding**

Thank you