

# ACR Appropriateness Criteria<sup>®</sup> Radiologic Management of Uterine Leiomyomas

Expert Panel on Interventional Radiology: *M-Grace Knuttinen, MD, PhD<sup>a</sup>, Gregory Stark, MD<sup>b</sup>, Eric J. Hohenwarter, MD<sup>c</sup>, Linda D. Bradley, MD<sup>d</sup>, Aaron R. Braun, MD<sup>e</sup>, Matthew G. Gipson, MD<sup>f</sup>, Charles Y. Kim, MD<sup>g</sup>, Jason W. Pinchot, MD<sup>b</sup>, Matthew J. Scheidt, MD<sup>i</sup>, David M. Sella, MD<sup>j</sup>, Clifford R. Weiss, MD<sup>k</sup>, Jonathan M. Lorenz, MD<sup>l</sup>*

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Journal Club 9/29/20

# Learning Objectives

By the end of this journal club, participants will be able to:

1. Identify usual and unusual presentations of uterine fibroids
2. Suggest imaging modalities to diagnose fibroids
3. Offer management plans for symptomatic fibroids, including those utilizing minimally invasive and IR techniques

# Module Outline

- I. **Case**
- II. Background
- III. Article Overview
- IV. Clinical Questions
- V. Key Points

# Case

- The patient\* is a, **31 yo** G2P1011, with no PMHx, unknown FHx, and **past surgical history of dilation and curettage** for missed abortion. She had a vaginal delivery at term in November 2019 and had a Mirena IUD placed at her postpartum appointment. She is up to date on Pap smears and has no history of STI.
  - The patient is breastfeeding and is **currently amenorrheic**.
- **HPI:** The patient experienced **severe period cramping** last week without associated bleeding. Two days ago, she had recurrence of cramping and **passed brownish blood** yesterday. She describes **pelvic pressure** radiating to her back and feels like **something is protruding into her vagina**.

\*Identifying information has been altered

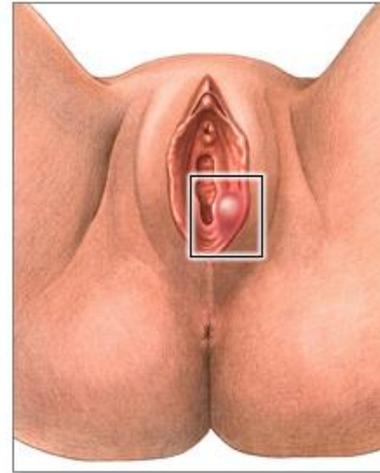
What additional information is needed?

# What additional information do we need?

- Last intercourse: 4 months ago
- Monogamous relationship since sexual debut at 17
- No vaginal odors
- No fevers
- Intermittent nausea lasting <1min, associated with cramps
- Chronic constipation, Metamucil occasionally helps

# Case

- Physical exam notable for:
  - IUD strings visible at the cervical os
  - **Swollen right vaginal wall** w/ severe tenderness at the posterior vaginal vault
- Impression:
  - likely Bartholin abscess
- Plan:
  - IUD removal
  - Referral to OBGYN for I&D and Word catheter placement



Bartholin cyst



ADAM.

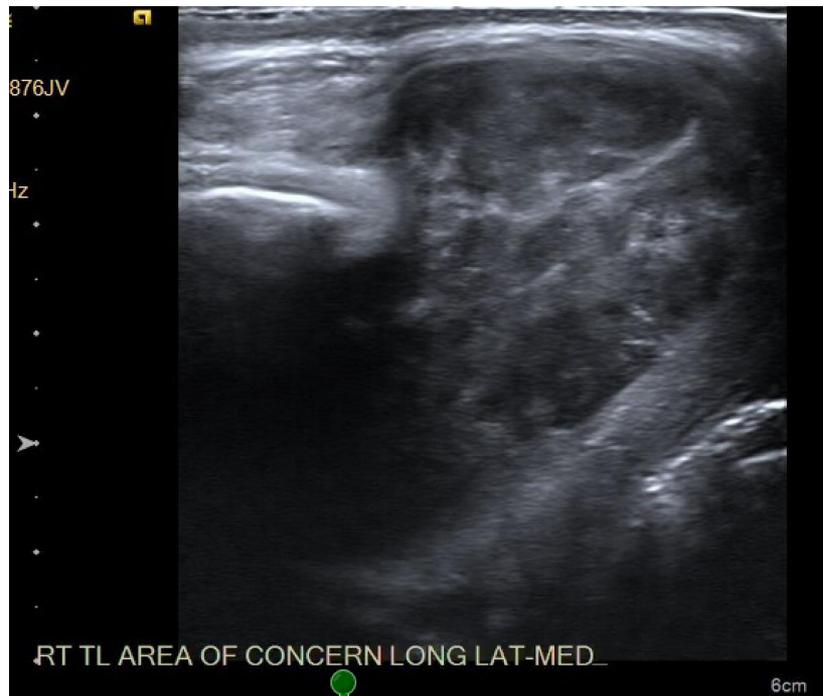
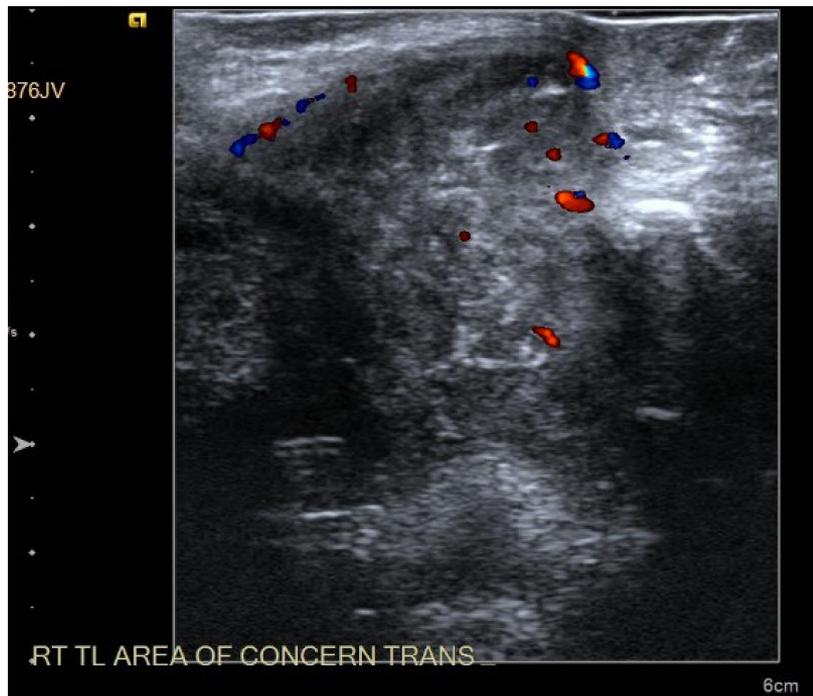
# Case

- **Next day at OBGYN appointment:**
  - I&D attempted, noted “spongiform” mass with no drainage
  - Continued uterine cramping despite IUD removal
- **Impression:**
  - “vulvar mass”
- **Plan:**
  - Biopsy sent to pathology
  - Pain control with ice compression and Motrin 600mg q6h
  - F/u in 1 week
  - IMAGING???

# Imaging

- US of pelvis – soft tissues
  - **Findings:** In the area of concern in the right vulva, there is a **heterogeneous solid mass measuring approximately 4.1 x 4.4 x 5.3 cm**. The mass demonstrates **blood flow on color Doppler evaluation** with arterial blood flow seen on spectral Doppler evaluation. There is no posterior acoustic enhancement. The mass appears to extend **deep to the pubic symphysis and is incompletely visualized** due to shadowing from the pubic symphysis. Echogenic foci at the superficial aspect of the mass likely reflect gas/post procedural changes status post attempted incision and drainage.
  - **Impression:** **Solid right vulvar mass**, which does not have features of a typical benign cyst, abscess, or hematoma. Recommend correlation with tissue sampling and pathology. The mass appears to extend posterior to the pubic symphysis and is incompletely visualized. If further imaging evaluation is needed, recommend CT abdomen pelvis with IV contrast.

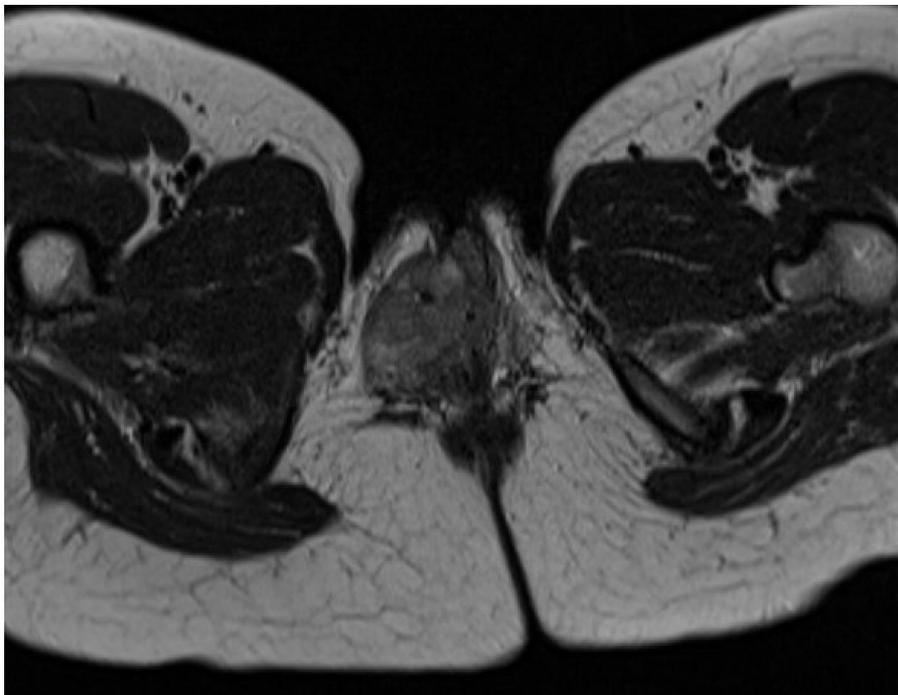
# Pelvic US



# MRI Abdomen & Pelvis

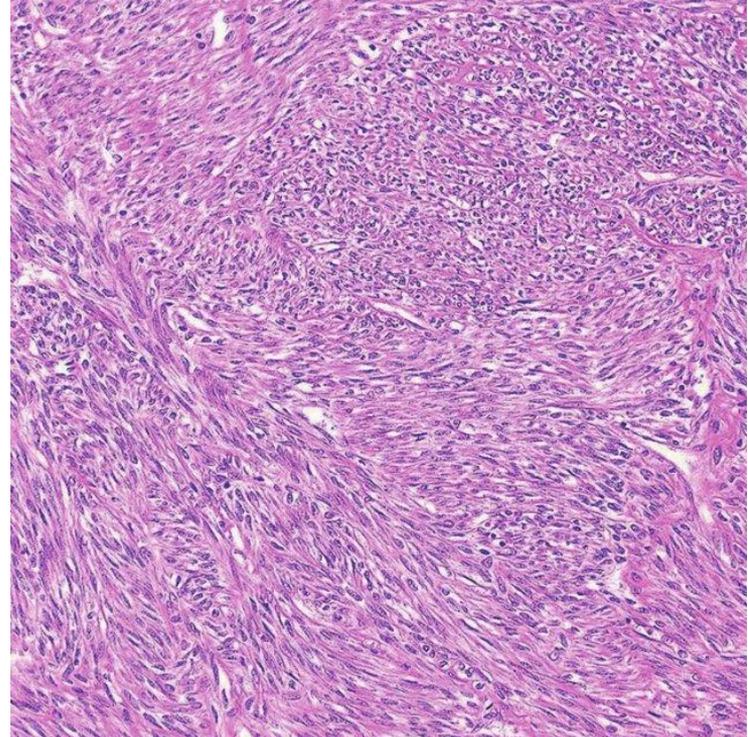
- **Reproductive organs:** Along the right vulvar region, extending anterior to the proximal urethra, there is a heterogeneously T2 hyperintense, mildly T1 hypointense, avidly enhancing circumscribed soft tissue mass which measures up to 4.2 x 3.2 x 6.3 cm. This mass exerts mild mass effect upon the bladder inlet, but there does not appear to be definitive infiltration into the urethra. Enhancement pattern and signal characteristics are similar to that of the uterus. Small flow voids are noted internally. Unremarkable uterus. No adnexal masses.
- **IMPRESSION:** Avidly enhancing vulvar mass which measures up to 6.3 cm and extends anterior to the proximal urethra, exerting mild mass effect upon the bladder inlet. This is compatible with tissue diagnosis of leiomyoma. **Next day addendum:** The described mass demonstrates intermediate T2 signal and low T1 signal extending from the level of bladder neck to the level of inferior vulva. The mass only shows mild T2 heterogeneity and slight heterogeneous enhancement at its inferior part. The mass mildly compresses the inferior bladder wall. The mass is predominantly located along the anterior wall of the urethra. The mass compresses and persists the distal urethra to the left side. The mass is located at the midline superiorly and towards the right side of the vulva more inferiorly. The mass also abuts and compresses the anterior vaginal wall. The mass appears well encapsulated. The mass does not show infiltrative features. The mass also likely pushes clitoris towards the left side. The signal intensity pattern with relatively homogeneous enhancement and right encapsulated appearance of the lesion is also compatible with distal pathologic diagnosis of leiomyoma. This lesion likely arises from the urethra.

# MRI Abdomen & Pelvis



# Pathology

- **Final diagnosis:** bland spindle cell neoplasm, suggestive of leiomyoma.
- **Comment:** Myofibroblastoma cannot be entirely excluded.
  - But remember, imaging showed the mass is well circumscribed.



# Case – Questions to Consider

- **Now what?**

- Urogynecology consult
- Gynecologic oncology consult
- General OBGYN consult
- Urology consult with cystoscopy:
  - **Assessment:** Normal appearing intraluminal urethra. **Appears like a vaginal fibroid extending almost entire side wall of vagina.**
- Interventional radiology consult?

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# Uterine Fibroids

Otherwise known as *fibroids* or *myomas*

## Epidemiology:

- Most common benign tumor in women of reproductive age. Affects >66% of women by age 50

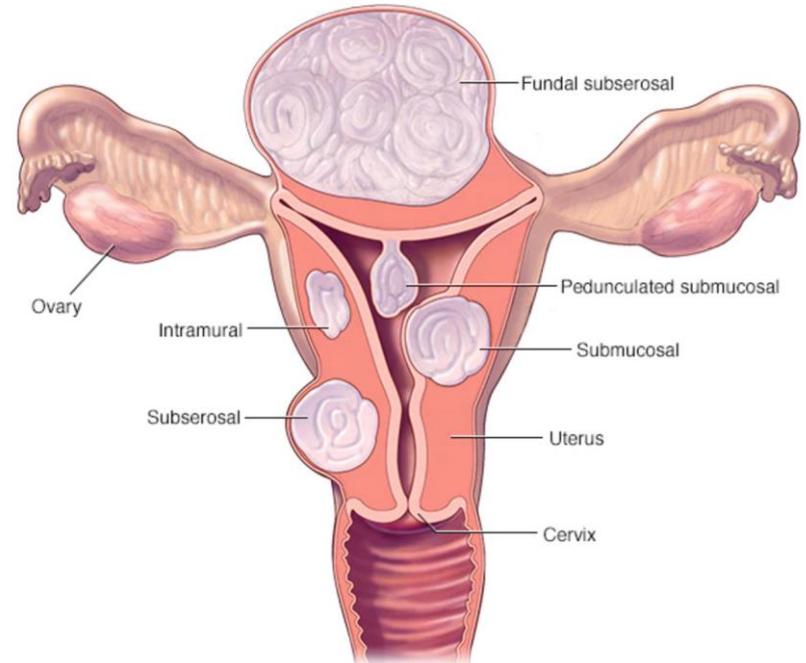
## Presentation:

- Asymptomatic
- Bulk-related symptoms (bloating, constipation, urinary retention, pain in the abdomen or lower back and during sex)
- Bleeding (menorrhagia, metrorrhagia, menometrorrhagia)



# Fibroid Pathology

- **Pathogenesis:**
  - Benign smooth muscle growths
- **Source:**
  - Uterus
- **Consequences:**
  - Can occur in many shapes and sizes
  - Growth patterns vary
  - Can recede at menopause
  - Miscarriages and infertility
  - 1 in 350 women who undergo myomectomy or hysterectomy for fibroids are found to have uterine sarcoma

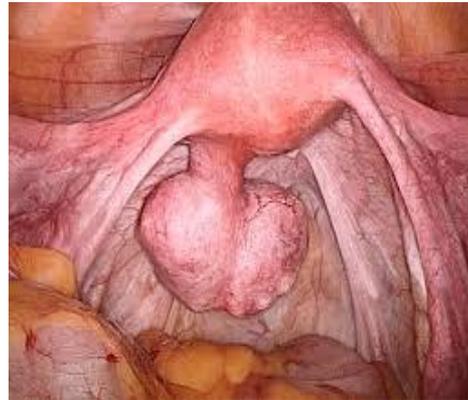
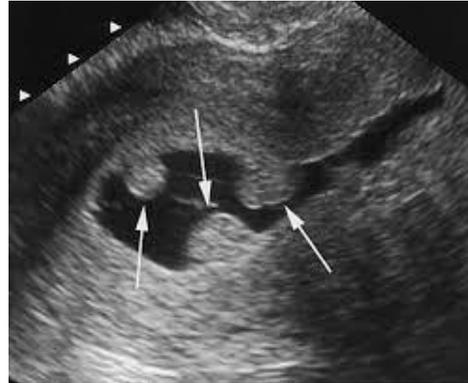


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# Diagnosis

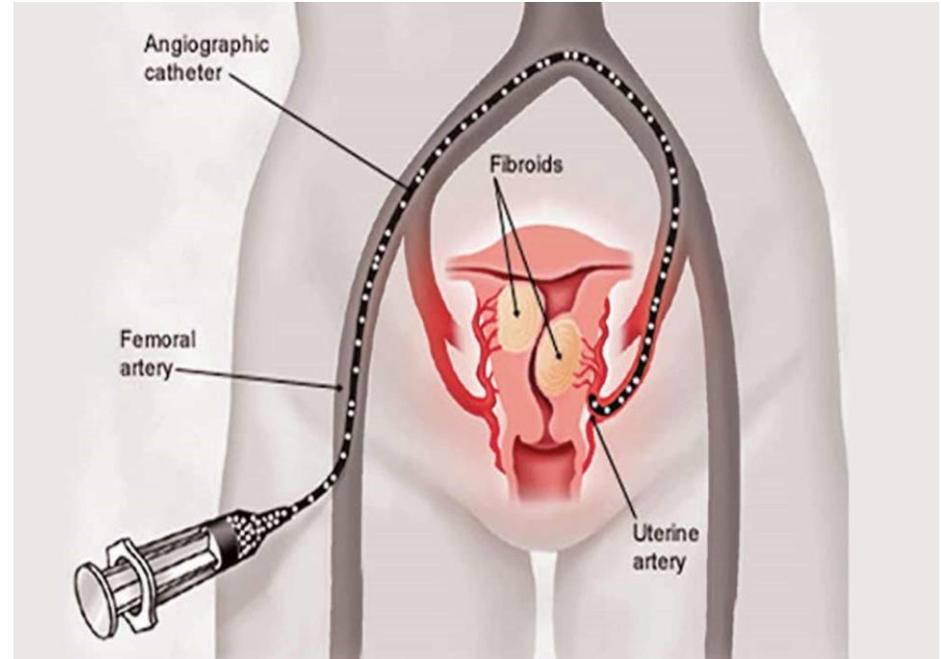
- Imaging:

- Ultrasonography
- Hysteroscopy
- Hysterosalpingography
- Sonohysterography
- Laparoscopy
- MRI and/or CT occasionally



# Treatment

- Medical management
- Minimally invasive treatment
  - Uterine artery embolization (UAE)
- Surgery
  - Myomectomy
  - Hysterectomy (variations)
    - Fibroids are the leading cause of hysterectomy in the U.S.



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**Purpose:** To provide **evidence-based guidelines for radiologic management of uterine leiomyomata** following annual review by a multidisciplinary expert panel.

**Journal:** Journal of the American College of Radiology, 2018

**Study Type:** Review

# Methods

- This review used data from:
  - **87 references** published between 1991 and 2016
    - **75 therapeutic studies**
      - 6 classified as well-designed
      - 38 classified as good-quality
      - 12 classified as having design limitations
    - **8 diagnostic references**
    - **4 meta-analyses**

# Appropriateness Ratings

Table 1. Appropriateness category names and definitions

Appropriateness Category Name	Appropriateness Rating	Appropriateness Category Definition
Usually Appropriate	7, 8, or 9	The imaging procedure or treatment is indicated in the specified clinical scenarios at a favorable risk-benefit ratio for patients.
May Be Appropriate	4, 5, or 6	The imaging procedure or treatment may be indicated in the specified clinical scenarios as an alternative to imaging procedures or treatments with a more favorable risk-benefit ratio, or the risk-benefit ratio for patients is equivocal.
May Be Appropriate (Disagreement)	5	The individual ratings are too dispersed from the panel median. The different label provides transparency regarding the panel's recommendation. "May be appropriate" is the rating category and a rating of 5 is assigned.
Usually Not Appropriate	1, 2, or 3	The imaging procedure or treatment is unlikely to be indicated in the specified clinical scenarios, or the risk-benefit ratio for patients is likely to be unfavorable.

# Discussion: Variants 1 & 2

**Variant 1.** Middle-aged woman with multiple uterine fibroids resulting in a 20-week-sized uterus on physical examination and menorrhagia. Bulk symptoms of urinary frequency and bloating are present. The patient has a recent negative serum pregnancy test and has no desire for future fertility.

Procedure	Appropriateness Category
Medical management	Usually Not Appropriate
MR-guided high-frequency focused ultrasound ablation	Usually Not Appropriate
Endometrial ablation	Usually Not Appropriate
Uterine artery embolization	Usually Appropriate
Laparoscopic uterine artery occlusion	Usually Not Appropriate
Myomectomy	Usually Not Appropriate
Hysterectomy	Usually Appropriate

- 1) Uterine artery embolization (UAE)
- 2) Endometrial ablation
- 3) Hysterectomy

**Variant 2.** Childbearing-age woman with multiple submucosal and intramural fibroids presents with menorrhagia and pelvic pain. Most of the fibroids measure <4 cm, with two dominant fibroids measuring >6 cm. Uterus is 12 cm on MRI. The patient states that she does not desire future pregnancies and is concerned about the loss of femininity with hysterectomy.

Procedure	Appropriateness Category
Medical management	Usually Not Appropriate
MR-guided high-frequency focused ultrasound ablation	Usually Not Appropriate
Endometrial ablation	Usually Not Appropriate
Uterine artery embolization	Usually Appropriate
Laparoscopic uterine artery occlusion	Usually Not Appropriate
Myomectomy	Usually Not Appropriate
Hysterectomy	May Be Appropriate

# Discussion: Variant 3

**Variant 3.** Childbearing age woman with menometrorrhagia. On MRI, she has three dominant leiomyomas, ranging in size from 6 to 8 cm and intramural in location. She states that she does not have plans for future pregnancy but would like to have the option in the future.

Procedure	Appropriateness Category
Medical management	Usually Not Appropriate
MR-guided high-frequency focused ultrasound ablation	May Be Appropriate
Endometrial ablation	Usually Not Appropriate
Uterine artery embolization	Usually Appropriate
Laparoscopic uterine artery occlusion	Usually Not Appropriate
Myomectomy	Usually Appropriate
Hysterectomy	Usually Not Appropriate

- 1) UAE
- 2) Medical mgmt
- 3) Myomectomy
- 4) LUAO (new!)
- 5) US ablation (new!)

# Discussion: Variant 4

Variant 4. Middle-aged woman with menorrhagia. MRI reveals a single 3 cm intramural fibroid and diffuse adenomyosis.

Procedure	Appropriateness Category
Medical management	Usually Not Appropriate
MR-guided high-frequency focused ultrasound ablation	Usually Not Appropriate
Endometrial ablation	May Be Appropriate
Uterine artery embolization	Usually Appropriate
Laparoscopic uterine artery occlusion	Usually Not Appropriate
Myomectomy	Usually Not Appropriate
Hysterectomy	Usually Appropriate

- 1) UAE
- 2) Surgery

# Discussion: Variants 5 & 6

**Variant 5.** Middle-aged woman with pelvic discomfort and 8 cm pedunculated subserosal fibroid on MRI.

Procedure	Appropriateness Category
Medical management	May Be Appropriate
MR-guided high-frequency focused ultrasound ablation	Usually Not Appropriate
Endometrial ablation	Usually Not Appropriate
Uterine artery embolization	Usually Appropriate
Laparoscopic uterine artery occlusion	Usually Not Appropriate
Myomectomy	Usually Appropriate
Hysterectomy	Usually Appropriate

- 1) UAE
- 2) Surgery

**Variant 6.** Middle-aged woman with constipation. MRI reveals a 12 cm subserosal leiomyoma compressing the rectum.

Procedure	Appropriateness Category
Medical management	Usually Not Appropriate
MR-guided high-frequency focused ultrasound ablation	Usually Not Appropriate
Endometrial ablation	Usually Not Appropriate
Uterine artery embolization	Usually Appropriate
Laparoscopic uterine artery occlusion	Usually Not Appropriate
Myomectomy	Usually Appropriate
Hysterectomy	Usually Appropriate

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# Clinical Questions

- How should this patient's fibroid be treated?
  - Plan now is for gyn-onc to surgically excise with urogyn involvement
- What clinical factors should we consider?
- Is UAE an option for this patient?

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# Key Points

- UAE is usually appropriate for all clinical variants in the article
- MR guided high-frequency focused ultrasound ablation may soon become a viable and common treatment modality
- IR should be considered when planning treatment for fibroids, especially among women who desire to retain fertility and who have suitable characteristics

## SUMMARY OF RECOMMENDATIONS

- Variant 1: Uterine artery embolization or hysterectomy is appropriate.
- Variant 2: Uterine artery embolization is appropriate.
- Variant 3: Myomectomy or uterine artery embolization is appropriate.
- Variant 4: Uterine artery embolization or hysterectomy is appropriate.
- Variant 5: Uterine artery embolization, myomectomy, or hysterectomy is appropriate.
- Variant 6: Uterine artery embolization, myomectomy, or hysterectomy is appropriate.

# Thank you!

## References

- Knuttinen, M-G., Stark, G., Hohenwarter, E. J., Bradley, L. D., ..., & Lorenz, J. M. (2018). ACR appropriateness criteria radiologic management of uterine leiomyomas. *Journal of the American College of Radiology*, 15(55), S160-S170.
- ACOG. (2020). Uterine fibroids: Frequently asked questions, gynecologic problems. Accessed online at <https://www.acog.org/patient-resources/faqs/gynecologic-problems/uterine-fibroids>
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