Cleveland Clinic

Redefining Fibroid Management: Uterine Fibroid Embolization As a Game Changing Alternative to Traditional Surgery

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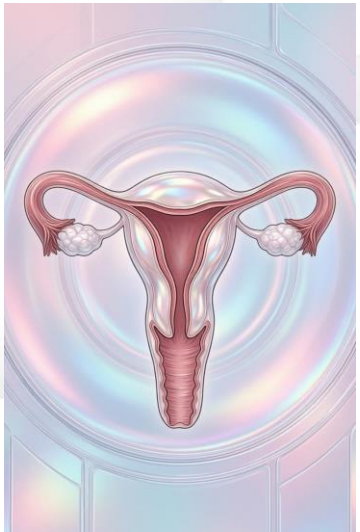

Disclosures

- Royalties for Up to Date chapters on Operative Hysteroscopy, and Hysteroscopic Fluid Management and Office Hysteroscopy
- Royalties for Operative Techniques in Gynecologic Surgery, Wolters Kluwer Publisher
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Objectives

1. Describe the mechanism of action, technical principles and clinical indications of uterine fibroid embolization and compare its therapeutic goals with those of surgical options such as myomectomy and hysterectomy.
2. Identify appropriate candidates, fertility considerations, contraindications for effective patient selection.
3. Assess the short and long-term outcomes, complications, recovery time, and patient satisfaction to integrate evidence- based counseling in shared decision making.

Why I Embrace Alternative Options

- **Practice differentiator**
- **Expands our concept of Center of Excellence for Fibroid therapy**
- **The collaboration with Interventional Radiology has increased services, options for women with fibroid and obstetrical hemorrhage.**
- **Improved provider relationships**
- **Excellent triage increases overall patient volume, resident/fellow education and maintains skill set of physicians interested in surgical procedures**
- **Superb clinical outcomes, decreased hospital stay, and low surgical complication rates**
- **Word of mouth from patients expands services to our department**

GENERAL GYNECOLOGY

Uterine fibroid embolization: a viable alternative to hysterectomy

Linda D. Bradley, MD

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UFE is NOT just for bleeding - it's a comprehensive treatment for ALL fibroid symptoms:

- ✅ Heavy bleeding - 83-96% improvement
- ✅ Bulk symptoms - 94% improvement
- ✅ Urinary issues - 86-92% improvement
- ✅ Pelvic pressure - 94% improvement
- ✅ Cosmetic concerns - Visible reduction
- ✅ Pain/dyspareunia - 71-94% improvement

THE WIN-WIN MESSAGE

- **UFE doesn't replace your surgical expertise - it complements it.** By offering your patients a comprehensive menu of options, including minimally invasive alternatives when appropriate, you demonstrate patient-centered care that builds loyalty and reputation.
- **The gynecologists who embrace collaborative UFE programs don't lose patients** - they gain recognition as physicians who put patient preferences first.
- The question isn't whether UFE works - **25 years of data prove it does.**
- The question is: ***Will you be the gynecologist who ensures your patients have access to all appropriate options? Can you build a collaborative practice with your interventional radiologist?***

Main Barriers Why Gynecologists Don't Embrace UFE

- Territorial Concerns
- Dogmatic Belief in Hysterectomy
- Patient Awareness Gap
- Post-Procedural Pain
- “I’m handling my patient to another specialty”
- Post –procedure pain is too severe
- What if there are complications that I can’t manage?
- I lose revenue if I refer
- I don’t know enough about UFE to counsel patients

Why Uterine Fibroid Embolization Matters Now?

- 3 out of 4 women with fibroids have never heard of Uterine Fibroid Embolization (UFE) from their gynecologist
- Patients are finding UFE online and asking questions

Your patients will ask about this - let's ensure you have the answers

Epidemiology

Cumulative Incidence by age 50[a]

- ~80% for black women
- ~70% for white women

Risk Factors

- Race: ↑ AAW[b]
- Obesity ↑[b]
- Hypertension ↑[c]
- Alcohol: ↑ in women who drink > 7 beers/week [d]
- Parity and smoking: ↓[b]

a. Baird DD, et al. *Am J Obstet Gynecol*. 2003;188:100-107; b. Faerstein E, et al. *Am J Epidemiol*. 2001;153:1-10; c. Boynton-Jarrett R, et al. *Am J Epidemiol*. 2005;161:628-638; d. Wise LA, et al. *Hum Reprod*. 2004;19:1746-1754.

GENERAL GYNECOLOGY

The impact of uterine leiomyomas: a national survey of affected women

Bijan J. Borah, PhD; Wanda K. Nicholson, MD, MPH, MBA; Linda Bradley, MD; Elizabeth A. Stewart, MD

OBJECTIVE: We sought to characterize the impact of uterine leiomyomas (fibroids) in a racially diverse sample of women in the United States.

STUDY DESIGN: A total of 968 women (573 white, 268 African American, 127 other races) aged 29-59 years with self-reported symptomatic uterine leiomyomas participated in a national survey. We assessed diagnosis, information seeking, attitudes about fertility, impact on work, and treatment preferences. Frequencies and percentages were summarized. The χ^2 test was used to compare age groups.

RESULTS: Women waited an average of 3.6 years before seeking treatment for leiomyomas, and 41% saw $\geq$2 health care providers for diagnosis. Almost a third of employed respondents (28%) reported missing work due to leiomyoma symptoms, and 24% believed that their symptoms prevented them from reaching their career potential. Women expressed desire for treatments that do not involve invasive surgery (79%), preserve the uterus (51%), and preserve fertility (43% of women aged <40 years).

CONCLUSION: Uterine leiomyomas cause significant morbidity. When considering treatment, women are most concerned about surgical options, especially women aged <40 years who want to preserve fertility.

Key words: hysterectomy, leiomyoma, quality of life, symptoms, uterine fibroids

Cite this article as: Borah BJ, Nicholson WK, Bradley L, et al. The impact of uterine leiomyomas: a national survey of affected women. Am J Obstet Gynecol 2013;209:319.e1-20.

The Many Faces of Uterine Fibroids: Clinical Presentation of Uterine Fibroids

- Asymptomatic
- Abnormal uterine bleeding
  - Heavy menses or prolonged menses
    changing a pad or tampon more than hourly, night-time changing
    doubling or tripling sanitary protection
    affects quality of life (QOL)
  - Irregular menses
  - Clotting
  - Anemia
- Post coital bleeding
- Leukorrhea
- Pelvic Pressure
  - Urinary frequency
  - Urinary urgency
  - Urinary retention
  - Pressure on kidneys
  - Urinary Incontinence
  - Constipation
  - Painful bowel movements

The Impact of Uterine Leiomyomas: A National Survey

- 968 women surveyed
- Waited 3.6 years before seeking treatment
- 41 % saw > 2 health providers for diagnosis
- 28% missed work due to leiomyoma symptoms
- 24% believed that symptoms prevented career potential
- 79% expressed desire for treatment that does not involve invasive surgery
- 51% desired uterine preservation
- 43% wanting fertility preservation if they are less than 40 years of age

Borah, B, Nicholson, W. Bradley, L, Stewart, E. The impact of uterine leiomyomas: a national survey of affected women. Am J Obstet Gynecol 2013;209:319

Why Women Want Alternatives?

- Concerns about impact on sexuality
- Femininity
- Fertility preservation
- Desire for “intactness”
- Most women want interventions that preserve the uterus
- Options
- Menopausal Concerns
- Early morbidity concerns
- Cultural

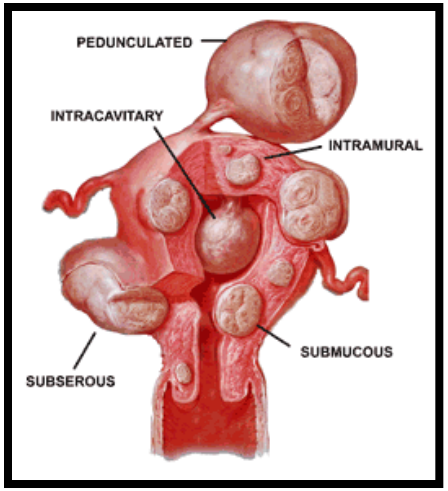
Ghant MS, Sengoba KS ,et. al.Beyond the physical :
a qualitative assessment of the burden of symptomatic uterine fibroids
On women’s emotional and psychosocial health. J Psychosom Res 78:499-503.

Interventional Radiologist: Friend or Foe?:

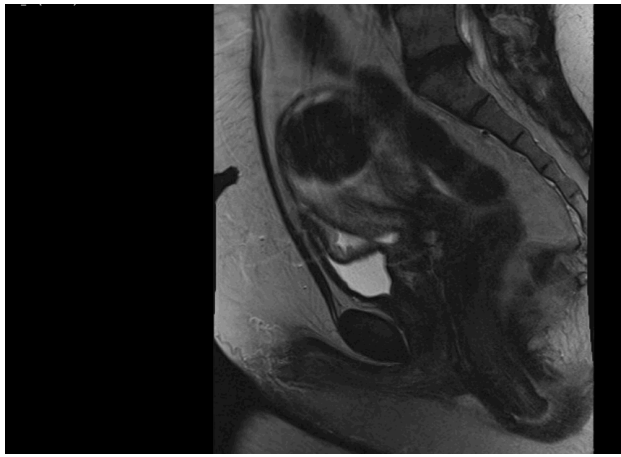
The IR who helps you with UFE today is the same IR who will save your patient's life during a catastrophic PPH at 3 AM tomorrow. Build that relationship now.

- 🚨 Postpartum hemorrhage and post abortal hemorrhage (97.8% bleeding control, saves fertility)
- 🚨 Cesarean scar ectopic (88.9% success, prevents catastrophic bleeding)
- 🚨 Placenta accreta (prophylactic balloons, reduces blood loss)
- 🚨 Cervical, and abdominal ectopic pregnancy (enables safe evacuation)
- 🚨 Gestational trophoblastic disease
- 🚨 Treatment of hemorrhage in pelvic cancer surgery
- 🚨 Uterine AVMs (fertility-preserving hemorrhage control)

Options for Women Must Be Individualized



- Dependent upon:
  - Desire for fertility
  - Importance of uterine preservation
  - Symptom severity (bleeding and pain)
  - Age of the patient and proximity to menopause
  - Pelvic co-morbidities
    - Adnexal mass
    - Prior extensive surgery
    - Pelvic prolapse
  - Fibroid characteristics: Size, number, and location of fibroids
  - Realistic expectations
  - It takes time to talk



From Surgical Accident to Therapeutic Revolution

- First UFE procedures for symptomatic fibroids reported in 1995 (Ravina)
- Originally intended as pre-surgical measure to reduce blood loss
- First U.S. experience: Goodwin (UCLA) 1997.
- 1999: several US centers offer UAE, case reports confirm early results

Historical Perspective

- Of first 16 patients:
  - 11 complete resolution of symptoms
  - 3 partial resolution
  - 2 went on to surgery
  - 100% technical success
- At 20-month follow-up, uterine volumes had reduced 20-60%

Ravina, et al. "Arterial embolization to treat uterine myomata," *Lancet* 346[8976]:671-672, 1995

UFE

Background

- Pelvic embolization performed for decades before UFE
  - Postpartum hemorrhage
  - Post-abortion, caesarian section
  - Bleeding ectopic pregnancy
  - Post-surgical hemorrhage
- Embolization for leiomyoma: Ravina 1995.
- First U.S. experience: Goodwin (UCLA) 1997.
- 1999: several US centers offer UFE, case reports confirm early results.

Three Decades of Clinical Evolution

1

1995–1999

Initial reports from France; technique spreads to North America and Europe with early case series

2

2000–2004

EMMY and REST trials provide first randomized data; FDA approves embolic particles specifically for UFE

3

2005–2014

Growing evidence base; ACR-SIR establishes practice parameters; technique refinement and patient selection optimization

4

2020

FEMME trial published in NEJM—definitive RCT comparing UFE to myomectomy establishes UFE as mainstream option

5

2020–2026

Meta-analyses confirm efficacy; multidisciplinary fibroid centers proliferate; expanding fertility data emerges

Ideal candidates for UFE

- **Most patients with symptomatic fibroid burden**
- Multiple fibroids (treats all at once)
- Large fibroid burden
- Patients with symptomatic fibroids, poor QOL, bulk symptoms, heavy menses, pelvic pressure
- Recurrent uterine fibroids after other therapies and hormonal management
- Patients wishing to avoid surgery and/or long recovery
- Patients desiring uterine preservation
- Perimenopausal and premenopausal patients
- Poor surgical candidates
  - Medical: anemia, anti-coagulated, obesity, cardiac disease, …
  - Surgical: extensive adhesive disease
  - Refusing blood products
- Patients with hysterectomy/hormone replacement concerns

Contraindications to Uterine Fibroid Embolization

- Asymptomatic patient
- Active infection, PID or vasculitis
- History of pelvic irradiation
- Life-threatening contrast allergy
- Renal failure or insufficiency (GFR< 30
- Arteriovenous shunting
- Undiagnosed pelvic mass
- Pedunculated serosal fibroid (stalk < 3 cm)
- Pregnancy
- Uncorrected Coagulation disorders

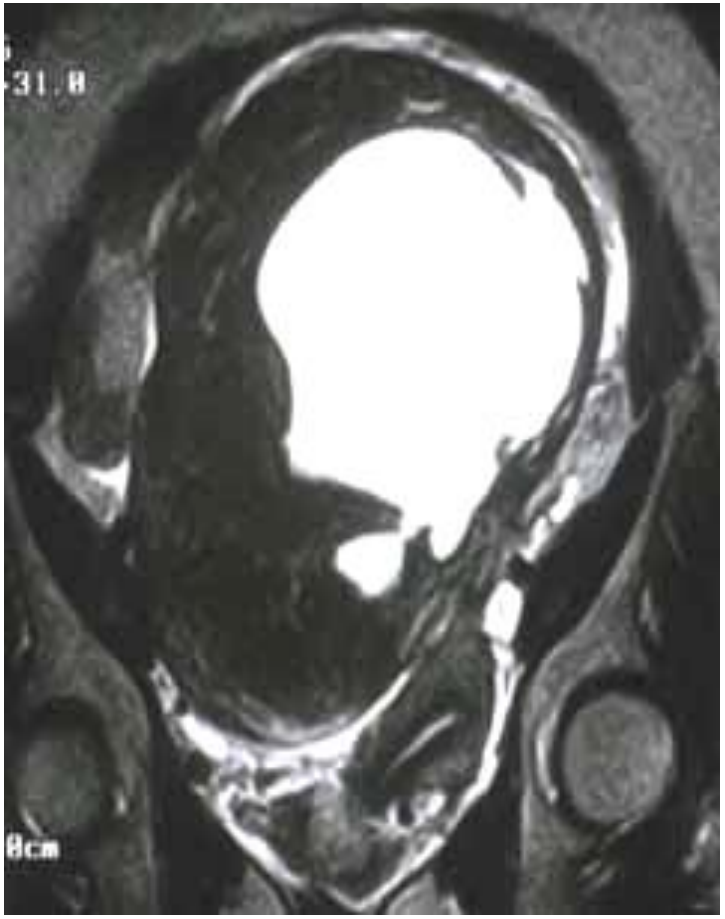
✅ **Uncorrectable coagulopathy** - INR >2.0, platelets <50k

Patient Selection

Who not to treat

- Postmenopausal bleeding with fibroids
- UFE is not for everyone.
  - 15 - 20% of patients MRI screened not appropriate
  - Some prefer hysterectomy
- Small pedunculated intracavitary fibroids
  - Hysteroscopic resection
- Large pedunculated serosal fibroids, with narrow stalk (< 3 cm)
- Does size matter?

Pedunculated Fibroids (narrow stalk)

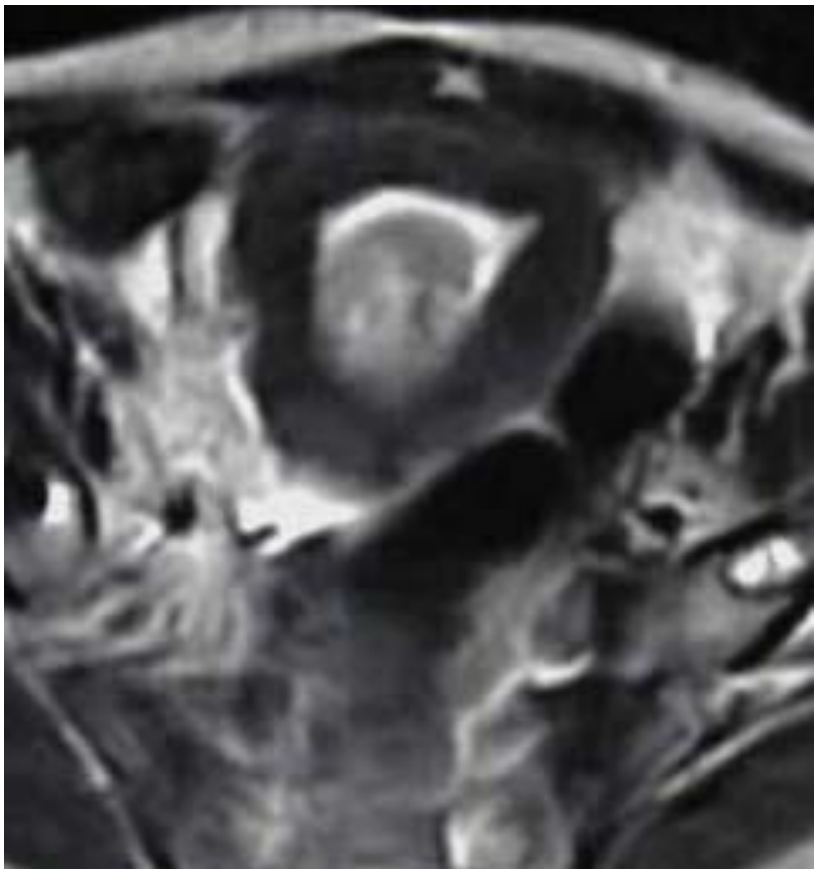


Patient Selection

When not to treat

- Indeterminate endometrial abnormalities
  - Complex endometrial hyperplasia
- Prolapsing fibroids
  - Best treated with hysteroscopic resection
- Very small, non-symptomatic fibroids
- Indeterminate ovarian or adnexal masses
  - Need definitive surgery and pathology

Indeterminate Endometrial Mass



Patient Selection

When not to treat

- Fibroids with hematometria
  - Fibroids rarely obstruct the uterus, R/O other causes
- Post-menopausal bleeding
  - *Marked concern if fibroid growing due to increased risk of leiomyosarcoma*
- Patients with severe atypical pain
  - Suspect endometriosis
  - Severe pelvic adhesions

Future Childbearing

- Patients must be counselled
- Risk of Asherman's syndrome
- Decreased endometrial perfusion
- Risk of hysterectomy

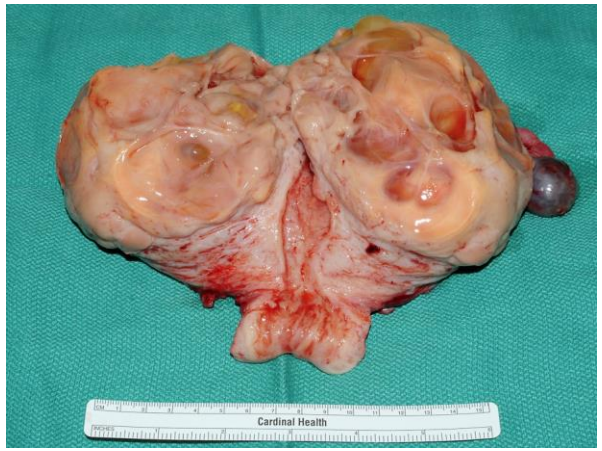
Pron, G. Pregnancy After UFE: The Ontario Multicenter Trial. Obst Gynecol 2005 (1):67-76.

Pre-Op Check List

- ✓Gynecologic abdominal, speculum exam, and bimanual exam
- ✓Up to date pap test (normal)
- ✓Obtained detailed history regarding fibroid symptoms
- ✓MRI female pelvis with and without contrast demonstrating evidence of leiomyoma perfusion, no concerning imaging for leiomyosarcoma
- ✓Endometrial biopsy to r/o endometrial hyperplasia or endometrial cancer, STI cultures if indicated
- ✓No evidence of uterine or cervical infection, no evidence of tubo-ovarian masses, no adnexal masses
- ✓Not currently using Depo-Lupron
- ✓Coagulation disorders must be corrected prior to procedure

Beware of these symptoms

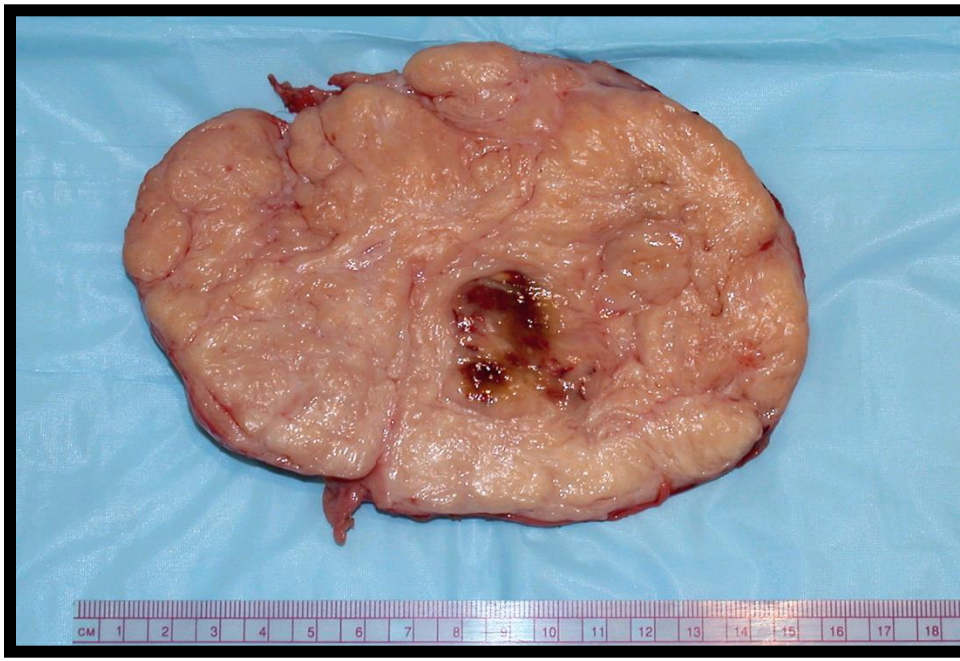
- Weight loss
- Rapid growth of uterine fibroids
  - Especially dominant fibroid > 8 cm
- Profound menorrhagia
- Fatigue
- Systemic symptoms
- Necrosis on MRI T1 T2 weighted images
- Mass with infiltrative margins and invasion



Leiomyosarcoma

Leiomyosarcoma

- 1% uterine malignancies
- Incidence
  - 0.075%-0.27%
- High mitotic rate
  - >10 HPF
- AUB, premenopausal
- Mean age dx 50.9 yrs
- Mean tumor size 9 cm
- 5 yr survival 10-50%
- 10 yr study of 21 patients with leiomyosarcomas, 95% had a solitary uterine mass
- Transcervical or radiographic bx helpful in women wishing to conserve uterus



Livi, L. Uterine sarcoma: 27 yrs of experience. In J Radiat Oncol Biol, Phys. 2003:57: 1366-1373

Expectations of IR- Patient Work-up

- Pre –op consultation—meet and greet
- Provide patient education and answer questions regarding UFE procedure
- Initiate pre-UFE consult with patient and coordinate workup with OB/Gyn
- Communicate to OBGyn if she is a candidate, and coordinate scheduling the procedure
- Admit patient into hospital and perform procedure
- Provide complete patient follow-up care and communicate key issues/procedure results with OB/Gyn
- Schedule patient follow up phone calls

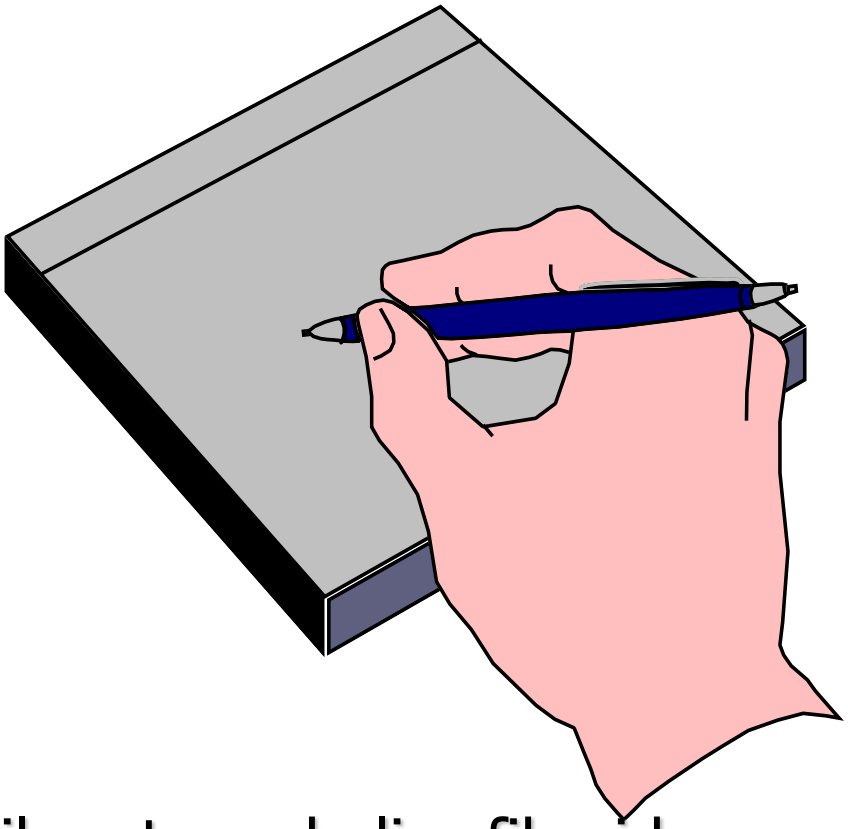
Scheduling for the UFE Procedure

- Off Lupron for at least 6-8 weeks (causes vasoconstriction of vessels
- Schedule ~2 weeks after last period
- Procedure date early in the week
- No active infection; relative contraindications addressed or resolved
- Patient should plan on being off work for about 7-10 days

Patient Preparation

- Intravenous line
- Foley catheter
- IV antibiotics; single dose (typically Ancef)
- Initial dose IV NSAID: Ketorolac (Toradol)
- PCA opiate pump setup in conjunction with Pain Management service
- Conscious sedation with Fentanyl and Versed during the procedure

Informed Consent



- Groin hematoma or infection
- Contrast material-related renal failure
- Allergic reactions to contrast media
- Uterine or pelvic infection
- Tissue infarction
- Possible need for hysterectomy

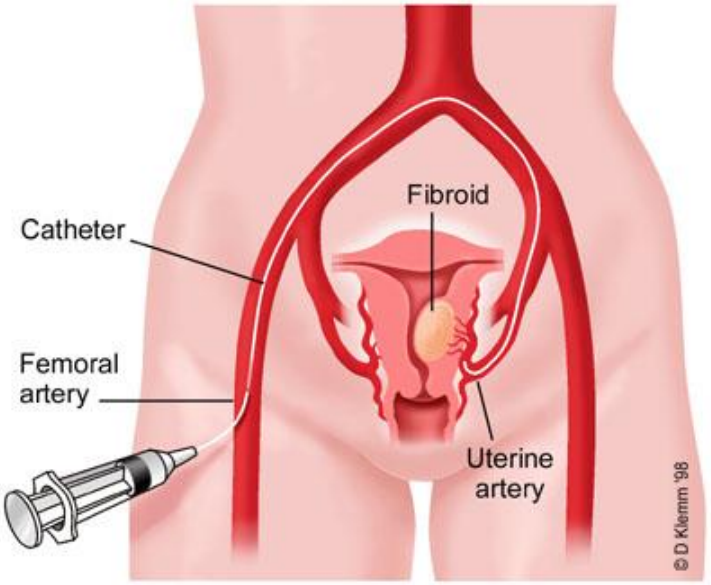
- Failure to embolize fibroids
- Unknown consequences of fertility
- Death

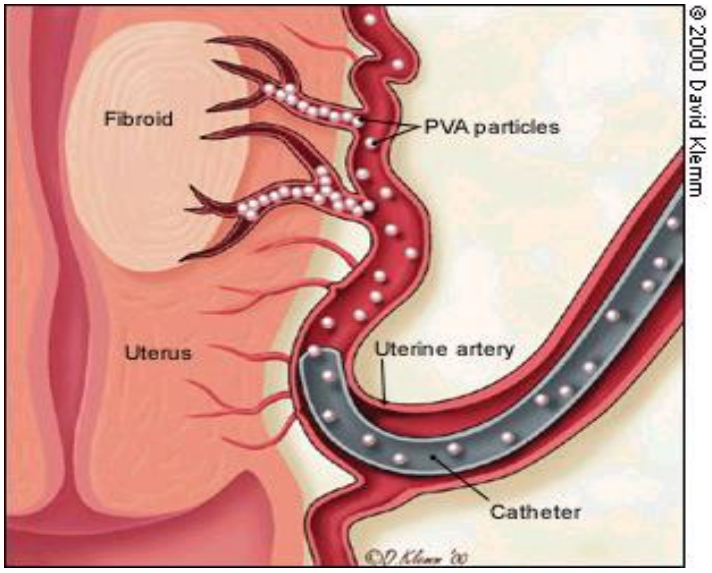
A Peek at the Procedure

- Typically 60-90 minutes
- Total fluoroscopy time 10-15 minutes
  - Equivalent to 1-2 barium enemas
- Single or bilateral femoral approached preferred
- Increasingly radial artery approach

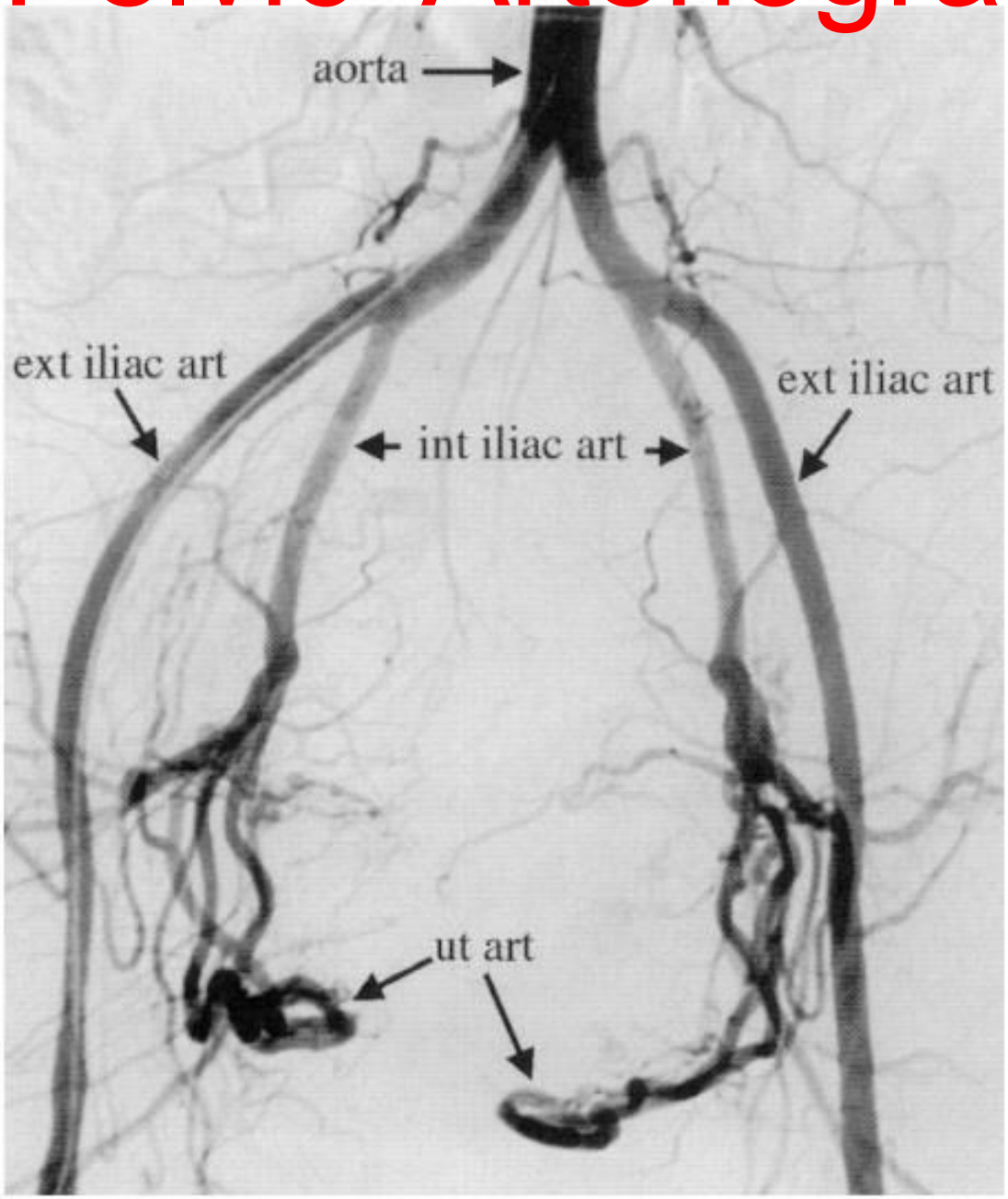
Principles of Uterine Fibroid Embolotherapy

- Goal: infarction and shrinkage of fibroid
- Differential in vascularity between fibroid and normal uterine tissue makes selective fibroid infarction possible from a proximal uterine artery catheter position

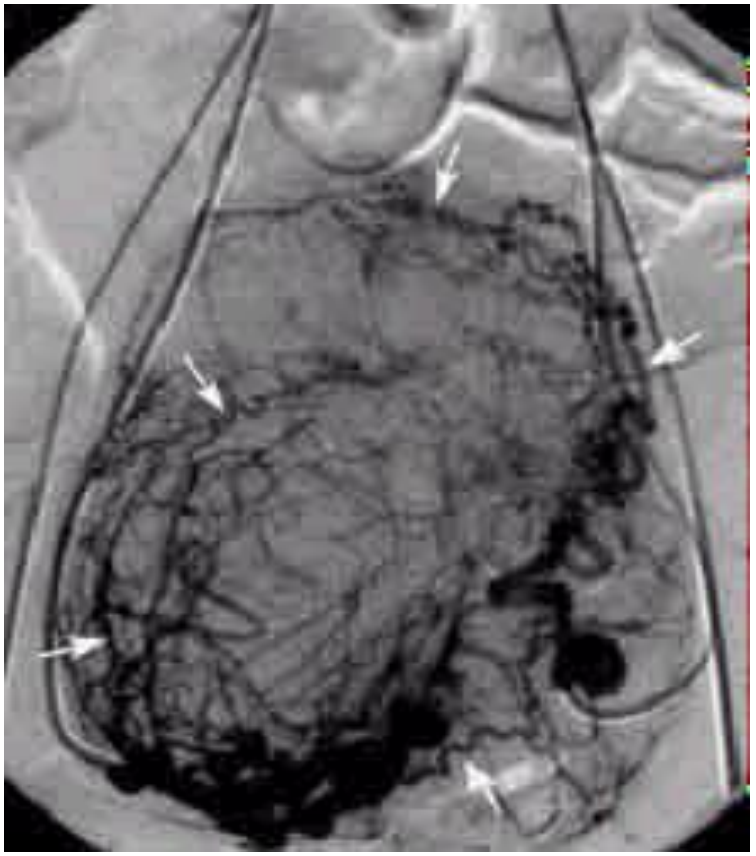




Pelvic Arteriogram



Pre and Post Arteriogram of Uterine Artery



Do Not Discharge

- If:
  - Pain not well controlled
  - Nausea
  - Vomiting
  - Urinary retention

Most readmissions due to these problems

UFE: Post-procedure Care

IR will manage:

- Catheter site care
- Pain control
- Discharge instructions/meds
- Next day phone call
- Outpatient follow-up with gynecologist
  - 4 weeks
  - 6 months
  - 12 months

Post-procedure Management

- Home-going meds: Percocet, Motrin, Toradol, Tylenol, Zofran, laxative, stool softener
- Phone follow-up:
  - T max
  - Pain trend
  - Local tenderness
  - Discharge / bleeding

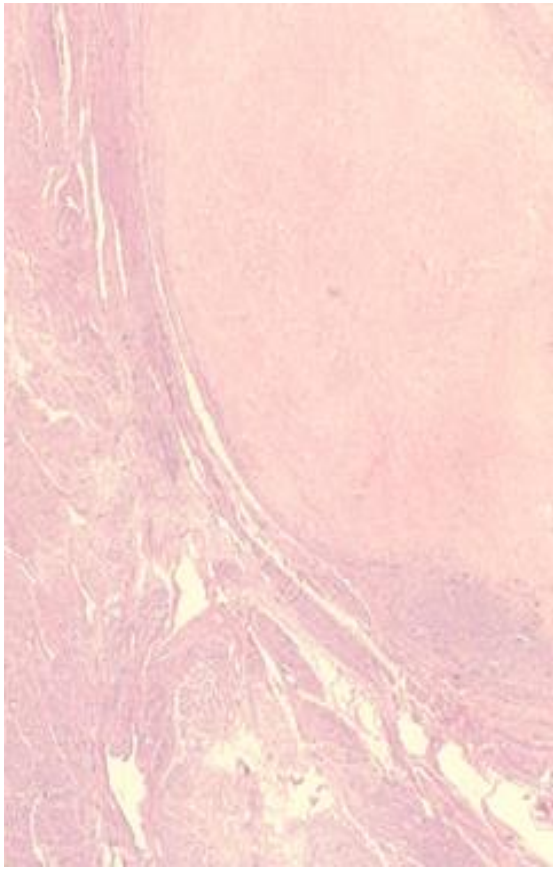
Expected Recovery Course

- Days 1-2
  - Pelvic cramping
  - Nausea, low-grade fever, malaise
  - Pain peaks in first 48-72 hours
- Day 2-7
  - Pain peaks and steadily improves
  - Fatigue is prominent and over underestimated
  - Low grade-grade fever (<38.5 C)
  - Resume light activity
- Vaginal discharge or light bleeding
- Days 7-10: increasing activity, requiring less medication. Variable character discharge
  - Avoid heavy lifting
- Days 10-14: Nearly normal, often reports decreased energy level, fatigue, and lethargy

UFE: Pathologic Changes

(Siskin, JVIR1999; 891-894)

- Embolization results in ischemic infarction of the leiomyomata.
- Normal myometrium is spared.
- Leiomyoma shrinks as result of hyaline degeneration.
- Degeneration continues for months to years.
- Both large and small leiomyomas infarcted



Major UFE Randomized Controlled Trials

Trial	Year	N	Comparison	Primary Outcome	Key Findings
FEMME	2020	254	UFE vs Myo	QOL (UFS-QOL)	Myo +8pts at 2y (NS at 4y); UFE 24% vs Myo 13% reintervention
EMMY	2005-16	177	UFE vs Hyst	Avoid hysterectomy	UFE avoided Hyst in 69% at 10y; QOL equivalent
REST	2007-11	157	UFE vs Surgery	QOL (SF-36)	No QOL difference; UFE 1d vs 5d hospital stay
MARA	2008	121	UFE vs Myo	Fertility	Myo better (19 vs 5 births); small numbers

FEMME Trial (NEJM 2020): UFE vs Myomectomy

Outcome	UFE	Myomectomy	P-value	Clinical Significance
QOL at 2 years	80.0 ± 22	84.6 ± 21	0.01	Small difference (8 pts)
QOL at 4 years	~85	~90	0.13 (NS)	No longer significant
Hospital stay	2 days	4 days	<0.001	UFE shorter
Recovery	2 weeks	6 weeks	<0.001	UFE faster
Complications	24%	29%	0.4 (NS)	Similar
Reintervention (4y)	24%	13%	--	UFE higher

Bottom line: Both effective; different risk-benefit profiles

UFE Clinical Outcomes Across Major Trials

Outcome	Result	Source
Heavy bleeding improvement	85-96%	FEMME, EMMY, REST
Bulk symptoms improvement	86-94%	REST, Ontario, 2025 study
Urinary frequency improvement	86-92%	REST, Ontario
Fibroid volume reduction	40-75%	All trials (MRI)
Uterine volume reduction	30-50%	All trials
Patient satisfaction	78-91%	EMMY, REST, Ontario

REINTERVENTION RATES

Trial	UFE	Comparator	Time
FEMME	***24%***	***13% (Myo)***	***4y***
REST	***32%***	***4% (Surgery)***	***5y***
EMMY	***31%***	***0% (Hyst)***	***10y***

2/3 of patients avoid hysterectomy long-term
Includes repeat UFE (minimally invasive)
Most occur in first 2-5 years
Higher reintervention is the main trade off

Complications: Comparable Safety

Complication Type	UFE Rate	Notes
Post-embolization syndrome	60-80%	Expected; pain/fever 24-48h; manageable
Minor (UTI, hematoma)	5-15%	Self-limited
Major (hysterectomy, VTE)	<2-5%	Rare
Permanent amenorrhea <45y	<1%	Very rare in young women
Permanent amenorrhea ≥45y	1-14%	Age-dependent

Comparison: FEMME 24% vs Myomectomy 29% (p=0.4 NS)

Fertility Outcomes: The Nuanced Reality

Study	*Pregnancy Rate*	*Live Births*	*Notes*
MARA (only RCT)	17/26 UFE (65%)	5 UFE vs 19 Myo	Small N; Myo better ($p<0.05$)
Meta-analyses	35-50%	60-70% of pregnancies	Observational data
McLucas 2023	40.5%	69.2% of pregnancies	Age-matched comparable

- **Limited data; shared decision-making essential**

- Ovarian reserve preserved (AMH/FSH unchanged)
- Myomectomy remains first-line for active fertility
- UFE option with counseling for high-risk cases

UFE vs Surgery: Quick Comparison

Factor	*UFE*	*Myomectomy*	*Hysterectomy*
Symptom relief	85-95%	85-95%	100%
Recovery	1-2 weeks	4-6 weeks	4-6 weeks
Hospital stay	1-2 days	4 days	4-5 days
Reintervention	24-32%	4-13%	0%
Uterine preservation	✓	✓	✗
Treats all fibroids	✓	✗	✓
Fertility	Possible*	Preserved	✗

Trial Synthesis

Outcome	UFE vs Surgery	Evidence Level	Clinical Significance
Symptom relief	Equivalent	Strong	Both very effective
Recovery time	UFE faster	Strong	2-4 weeks difference
QOL (short-term)	Surgery slightly better	Moderate	Small difference
QOL (long-term)	Equivalent	Strong	Converge over time
Reintervention	UFE higher	Strong	24-32% vs 4-13%
Safety	Equivalent	Strong	Both safe
Fertility	Surgery better	Moderate	Limited data

PRIMARY OUTCOME: Quality of Life at 2 Years

- **UFS-QOL Scores (0-100, higher = better)**
- **At 2 years:**
- **Myomectomy:** Mean 84.6 ± 21.5
- **UFE:** Mean 80.0 ± 22.0
- **Difference:** 8.0 points (95% CI: 1.8-14.1; p=0.01)
- **Adjusted difference:** 6.5 points (with imputation)

- **Both treatments significantly improved QOL** from baseline
- ✅ **Myomectomy showed statistically superior QOL** at 2 years
- ⚠️ **8-point difference** - clinically meaningful but modest (minimal important difference for UFS-QOL is ~10 points)
- ⚠️ **81% response rate** - 19% missing data limits generalizability

FEMME Trial Outcomes

- **Quality of Life at 4 Years**
- **Myomectomy:** Better by 5.0 points (95% CI: -1.4 to 11.5; **p=0.13 NOT significant**)
- **Key finding:** QOL difference narrowed and **lost statistical significance** by 4 years
- **Response rate:** Only 53-64% completed 4-year questionnaires
- **Interpretation:** Missing data limits conclusions, but suggests outcomes converge over time

- **Reintervention Rates: At 2 years:**
- **UFE:** 16% (18/110 patients)
- **Myomectomy:** 7% (8/111 patients)
- **Types of reintervention in UFE group:**
  - Repeat UFE: some patients
  - Myomectomy: some patients
  - Hysterectomy: some patients
- **At 4 years:**
- **UFE:** 24% cumulative reintervention
- **Myomectomy:** 13% cumulative reintervention
- **Hazard ratio:** 0.53 (95% CI: 0.27-1.05)

Reintervention Rates

- **SECONDARY OUTCOMES**
- **Complications (All Initial Procedures)**
- **Myomectomy:** 34/118 (29%)
- **UFE:** 27/113 (24%)
- **Relative risk:** 1.2 (95% CI: 0.8-1.9; p=0.4) **NO significant difference**
- **Fibroid Infarction (UFE group only)**
- **At 6 months:** 32/80 (40%) had complete fibroid infarction
- **Interpretation:** Not all fibroids completely infarct, but symptom relief still occurs

- **Key complications:**
- 1 conversion of myomectomy → hysterectomy
- 1 laparoscopic → open myomectomy conversion
- Blood transfusion rate higher in myomectomy (as expected)
- **Hospital Stay**
- **UFE:** Median 2 days
- **Myomectomy:** Median 4 days
- **Significantly shorter for UFE** ($p<0.001$)
- **Recovery Time**
- **UFE:** ~2 weeks to return to normal activities
- **Myomectomy:** ~6 weeks to return to normal activities

What Did the Trials Teach Us?

- Four major trials over 15 years consistently show UFE is safe, effective, and offers faster recovery than surgery.
- The trade-off is higher reintervention rate (24-32%), but many patients accept this for uterine preservation and minimal invasiveness.
- Patient selection and shared decision-making are key."

Reintervention Rates

- All trials
- REST: 32% at 5 years (early data)
- EMMY: 31% eventual hysterectomy at 10 years
- FEMME: 24% at 4 years (modern technique)

•2/3 of UFE patients avoid hysterectomy permanently
•Most failures occur in first 2-5 years

•2/3 of UFE patients avoid hysterectomy permanently

•**Satisfaction:** 78% UFE, 87% hysterectomy

Isn't the higher reintervention rate a deal-breaker?

Let's look at the data in context

- FEMME: 24% reintervention at 4 years, but includes repeat UFE (minimally invasive)
- EMMY: 31% eventual hysterectomy at 10 years - but 69% AVOIDED hysterectomy
- Many patients prefer the possibility of repeat minimally invasive procedure to upfront major surgery

It's about patient values: some want definitive, some want uterine preservation

Should we offer UFE to women who want children?

- MARA is the only RCT, showed myomectomy better fertility in first 2 years
- BUT: Only 5 live births in UFE group - too small to draw definitive conclusions
- Other studies show 40% pregnancy rate among women attempting conception post-UFE
- **Current recommendation: Myomectomy first-line for active fertility pursuit—find the best gyn surgeon**

UFE is option when: high surgical risk, multiple/diffuse fibroids, patient preference after full counseling

MARA Trial

- **MARA Trial - Fertility Data**
- **Pregnancy attempts:** 26 UFE, 40 Myomectomy
- **Pregnancies:** 17 UFE (65%), 33 Myomectomy (83%)
- **Live births:** 5 UFE, 19 Myomectomy ($p<0.05$)
- **Limitations:** Small numbers, selection bias, short follow-up
- **Caption:** "Only RCT, but limited by small sample size"

What about the pain issue?

- Rumors about severe pain (heart attack of the pelvis) - WAS a barrier
- Modern pain management has changed this: superior hypogastric nerve block (2024 data)
- Currently 90% same-day discharge, 65% reduction in opioid requirements
- Early trials (REST, EMMY 2005-2007) had overnight stays
- FEMME (2020) showed improved pain management

Current practice much better than reputation suggests

Why should I refer to UFE when surgery is definitive?

Trial data demonstrates

- FEMME showed both treatments work - different risk-benefit profiles
- UFE advantages: 2-week vs 6-week recovery, outpatient vs hospital stay, treats all fibroids
- Surgery advantages: slightly better QOL at 2 years (gone by 4 years), lower reintervention
- It's about patient preference: not everyone wants or can have surgery
- EMMY showed 78% satisfaction with UFE despite possibility of reintervention

UFE is NOT just for bleeding - it's a comprehensive treatment for ALL fibroid symptoms:

- ✅ Heavy bleeding - 83-96% improvement
- ✅ Bulk symptoms - 94% improvement
- ✅ Urinary issues - 86-92% improvement
- ✅ Pelvic pressure - 94% improvement
- ✅ Cosmetic concerns - Visible reduction
- ✅ Pain/dyspareunia - 71-94% improvement

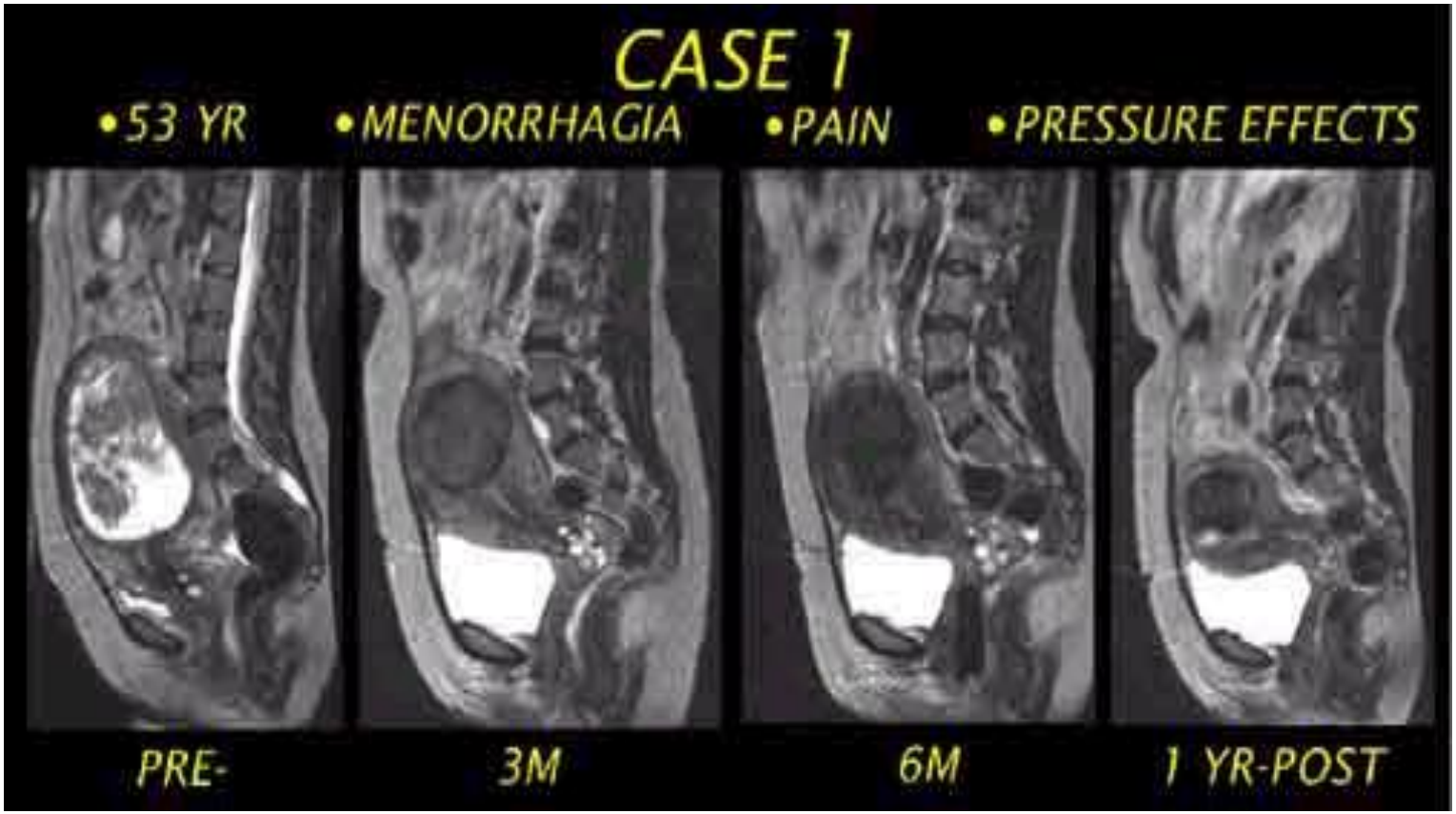
PATIENT SELECTION FOR BULK SYMPTOMS
IDEAL Bulk Symptom Candidates:

- ✅ **Strong Indications:**
- Large intramural or submucosal fibroids causing visible abdominal distension
- Urinary frequency with anterior fibroids compressing bladder
- Pelvic pressure interfering with daily activities
- Constipation with posterior fibroids
- Cannot wear normal clothing due to fibroid bulk
- Dyspareunia from large fibroids
- ✅ **Excellent Prognostic Factors:**
- Intramural fibroids (best response)
- Vascular fibroids on MRI
- Clear correlation between fibroid location and symptoms
- Large baseline fibroid volume (more room for improvement)
- ⚠️ **Caution/Set Expectations:**
- Very large fibroids (>20 cm) - still help but may not eliminate all bulk
- Pedunculated subserosal - variable response
- Mixed fibroid/adenomyosis - less predictable
- Obesity - fibroid reduction may not be as cosmetically visible

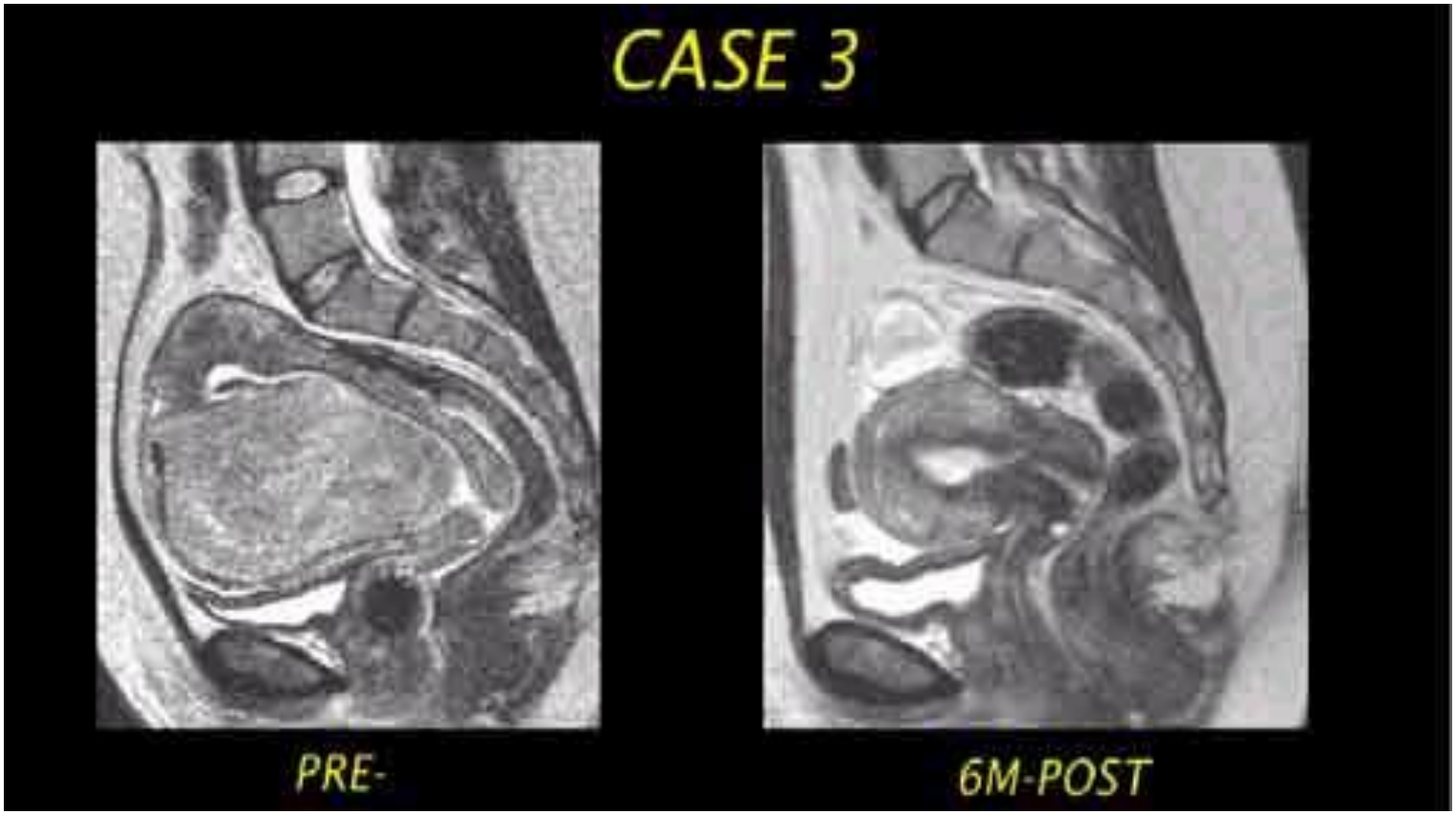
COUNSELING SCRIPT FOR BULK SYMPTOMS

- **For Patient with Urinary Frequency:**
- **"Will UFE help my constant need to urinate?"**
- Absolutely - this is actually one of the first symptoms to improve, often within 2-4 weeks.
- Studies show 86-92% of patients have significant improvement in urinary frequency. As the fibroids shrink, they stop compressing your bladder, and your bladder capacity returns to normal.
- Many patients tell us they can finally sleep through the night without multiple bathroom trips.

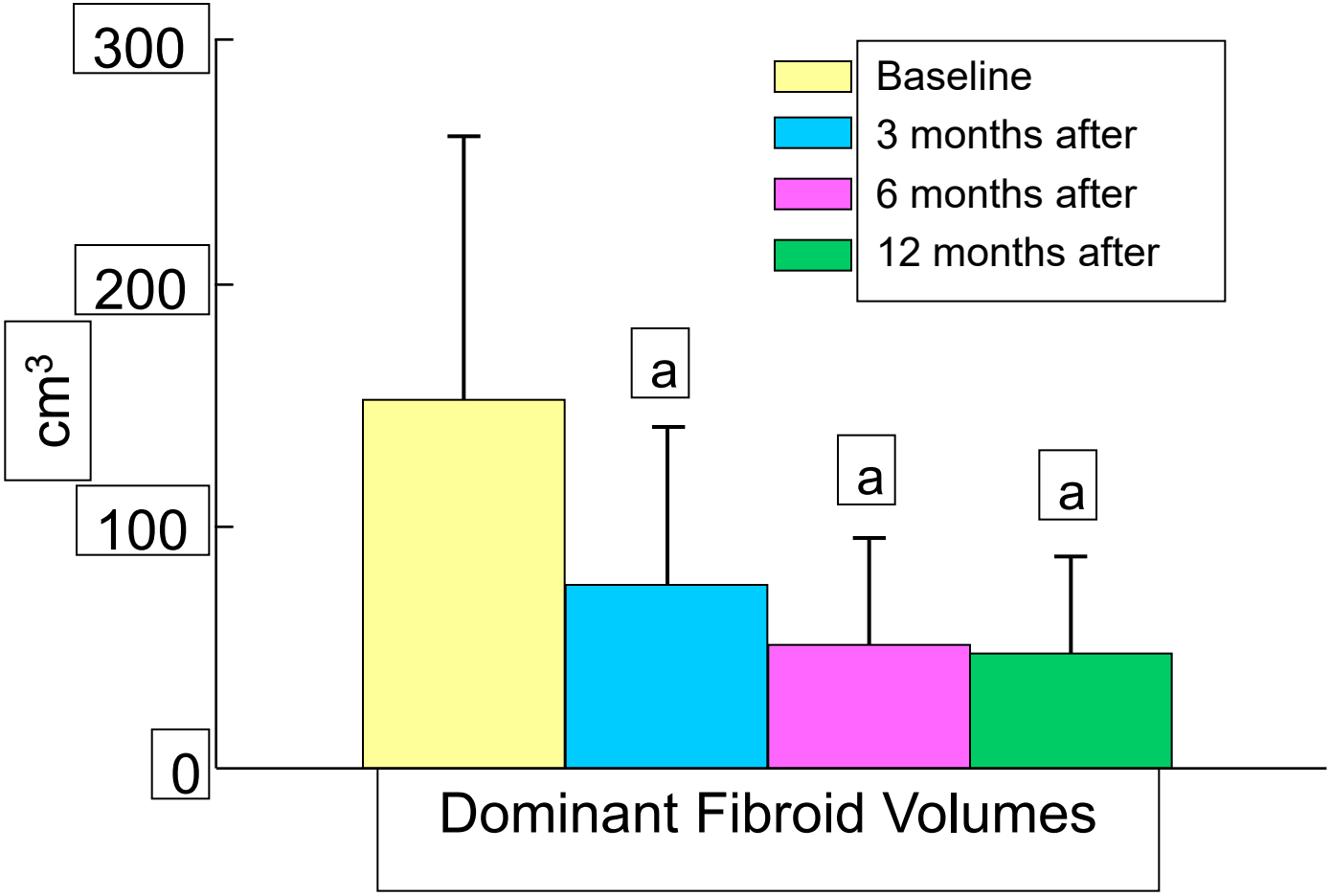
Dramatic Effects Over One Year



Pre and Post Embolization



Mean (±SD) Dominant Fibroid Volumes Before and After Uterine Artery Embolization



Troupeano G. et al., Fertility & Sterility. 81(4):1055-61,Apr 2004.

Patients with Pelvic Pressure:

- **"I constantly feel this heavy pressure in my pelvis - will that go away?"**
  - Yes - 94% of patients report improvement in pelvic pressure and heaviness. As the fibroids shrink by 40-75% in volume, that feeling of 'something there' diminishes significantly.
  - Patients describe feeling lighter and more comfortable. The softening of the fibroids also helps - even if they don't completely disappear, they become less rigid and cause less pressure sensation.

Bulk Symptoms

- **My fibroids are pushing on my bowels - will UFE help?**
- If your MRI shows posterior fibroids compressing the rectum, then yes, UFE should help your constipation. As the fibroids shrink, they relieve pressure on your colon, making bowel movements easier. This typically improves over 2-3 months as the fibroids progressively shrink. We always recommend high-fiber diet and adequate hydration during recovery as well.

Will my stomach go back to normal?"

- UFE will significantly reduce your uterine size - typically 30-50% over 3-6 months.
- You'll notice your clothes fitting better and the visible bulge decreasing. The degree of improvement depends on how large your fibroids are to start.
- If you currently look 5 months pregnant, you might reduce to looking slightly full, but not pregnant. It's a gradual process, so you'll see progressive improvement over several months.

UFE: Beyond Heavy Bleeding- Common Misconception: UFE only helps bleeding

- **Reality - Excellent Bulk Symptom Relief:**
- Pelvic pressure: 94% improvement
- Urinary frequency: 86-92% improvement
- Abdominal bloating: 94% improvement
- Constipation: Significant improvement
- Back/leg pain: Improves with shrinkage
- Sexual function: 71% improvement

Set realistic cosmetic expectations - significant improvement, not necessarily flat abdomen, gradual process over 3-6 months

UFE Advantage: Preserves Anatomy

EMMY Trial Finding:

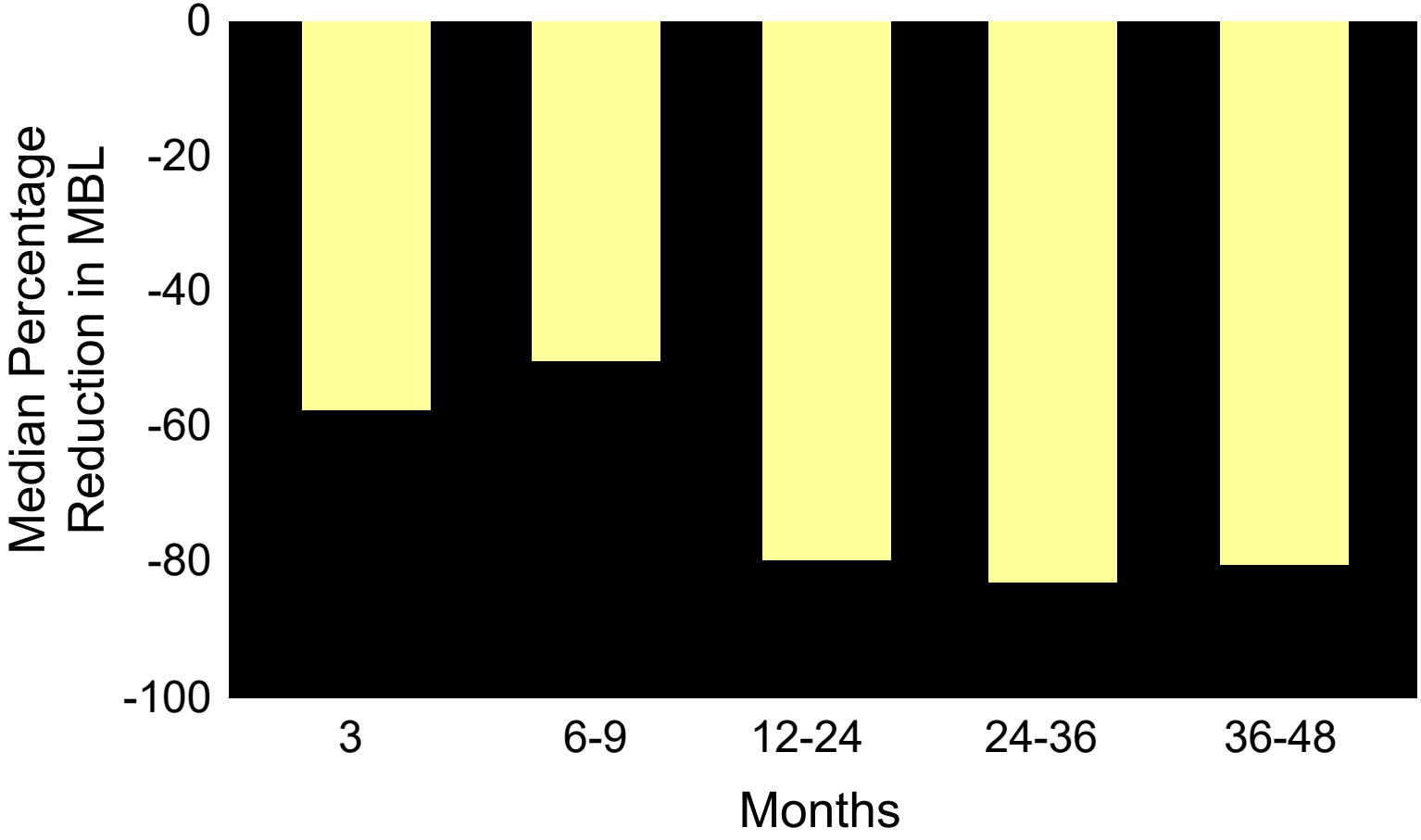
- UFE patients: Better pressure symptom improvement than hysterectomy
- Hysterectomy patients: More stress urinary incontinence post-op
- **Why?**
- UFE reduces mass WITHOUT altering pelvic floor
- Hysterectomy removes organ but can destabilize pelvic support
- **UFE provides relief while maintaining anatomic integrity**

MBL (in mL) Pre- and Post-embolisation

	n	Range	Median
Pretreatment	50	9-1339	162
3 months	34	0-767	60
6-9 months	34	0-1283	70
12-24 months	25	0-265	37
24-36 months	17	0-205	18
36-48 months	6	0-66	41

Khaund A. et al., BJOG. 111(7):700-5, 2004.

Median Percentage Reductions in MBL at All Post-treatment Time Intervals



Khaund A. et al., BJOG. 111(7):700-5, 2004.

"Timeline of Symptom Relief"

Weeks 1-4 (First to improve):

- Urinary frequency ⬇️
- Abdominal bloating ⬇️
- Pelvic pressure eases
- **Weeks 4-12:**
- Menstrual bleeding improves
- Pain resolves
- Progressive shrinkage
- **Months 3-6:**
- Maximum fibroid shrinkage
- Cosmetic improvement visible
- All symptoms optimally improved

The Fibroid Shrinkage Effect"

- **What Happens:**
- 40-75% fibroid volume reduction
- 30-50% uterine volume reduction
- Progressive over 6-12 months

- **Clinical Impact:**
- Reduced mass effect on bladder, bowel, nerves
- Softening of fibroids (less rigid pressure)
- Visible abdominal reduction
- Improved pelvic mechanics

Pregnancy Outcomes after UFE

- Walker & McDowell
  - 56 pregnanices/1200 UFE's
    - 59% live births
    - 18% preterm delivery
    - 30% placental complications
    - Higher malposition rates
    - 30.4% miscarriage
    - 72.7% delivered by C/S
    - 18.2% post partum hemorrhage

These complications were higher than in the general obstetrical population

Walker WJ, et al. Pregnancy after UFE for leiomyomata: a series of 56 completed Pregnancies. Am J Obstet Gynecol 2006;195(5) 1266-1271

Fertility Outcomes

MARA (only RCT)

- Only RCT: MARA showed myomectomy better fertility in first 2 years
- ": Small numbers (only 5 UFE live births), selection bias"" remains first-line for active fertility pursuit

FEMME ovarian reserve data

- "FEMME showed no ovarian damage from UFE"
- "FSH, AMH levels preserved"

THE JOURNAL OF
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J. Obstet. Gynaecol. Res. Vol. 38, No. 5: 823–831, May 2012

Hysteroscopy after uterine fibroid embolization: Evaluation of intrauterine findings in 127 patients

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Abstract

Aim: Several atypical hysteroscopy findings have been described in association with uterine artery embolization (UAE). The purpose of this study was to evaluate the types and frequency of these findings in the largest published series of patients.

Material and Methods: Premenopausal patients after bilateral UAE for symptomatic intramural fibroid underwent subsequent hysteroscopic examination 3–9 months following UAE. The uterine cavity was examined with focus on specific post-embolization changes. Biopsy of endometrium was obtained and evaluated together with a biopsy of abnormal foci if present.

Results: UAE was performed in a total of 127 women with an average size of dominant fibroid 63.1 mm in diameter and an average patient age of 35.1 years. Even though the majority of patients were asymptomatic at the time of hysteroscopy (78.0%), the post-embolization hysteroscopic examination was normal in only

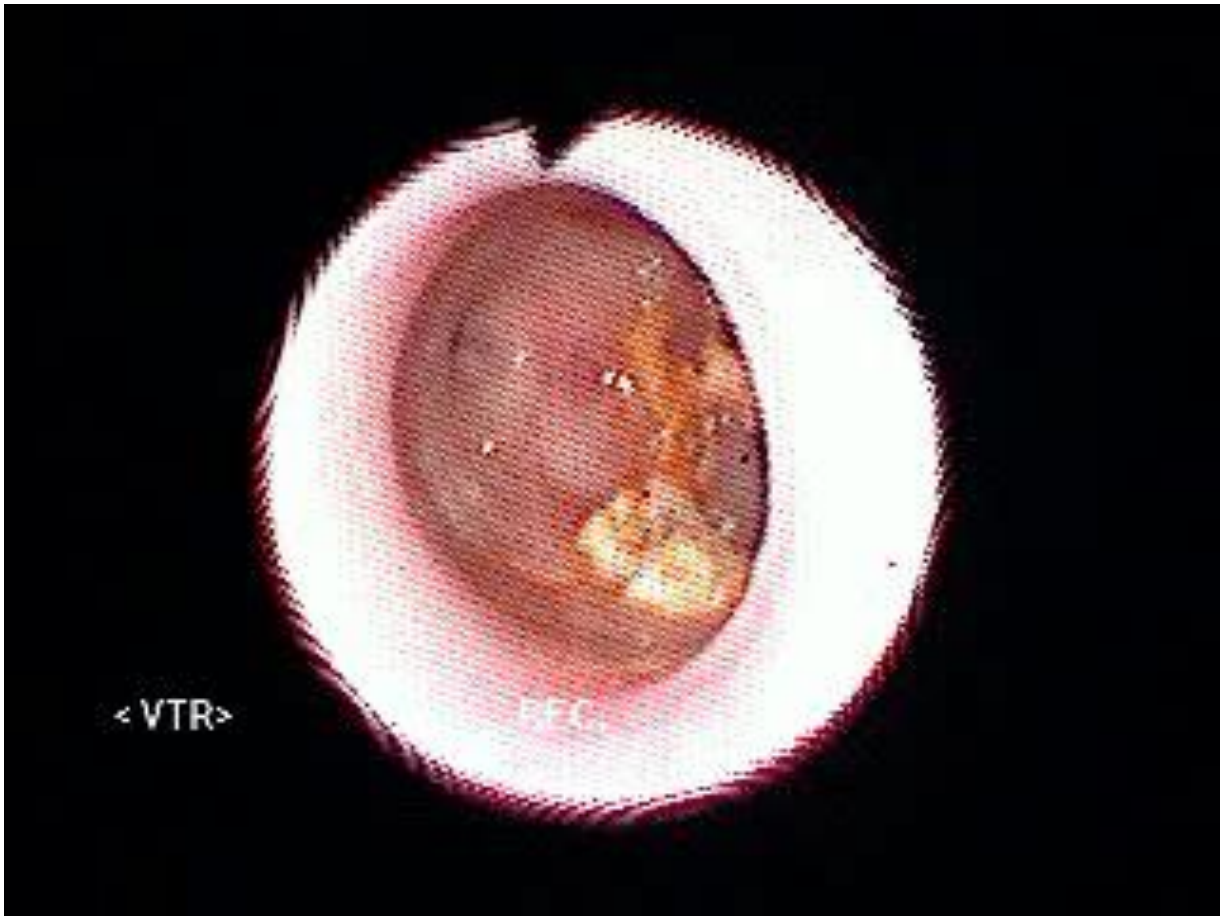
Mara, M. et. al. Hysteroscopy after uterine fibroid embolization: Evaluation of intrauterine findings in 127 patients. J. Obstet. Gynaecol Res 2012;38(5):823-831.

Hysteroscopy after UFE: The Findings

- Reported 51 cases after UFE
  - 63% had hysteroscopic abnormalities
  - Intrauterine protrusion 19/51 (37%)
  - Yellowish color of endometrium 14/51(28%)
  - Intrauterine or cervical adhesions 7/51(14%)
  - Communication between myoma and uterine cavity (uterine fistula) 5/51(10%)
  - Histologically normal endometrium 90%
  - Regressive changes (necrosis, hyalinization)

Mara, M. Hysteroscopy after uterine fibroid embolization in women of fertile age. J Obstet Gynaecol Res.2007: 33:3: 316-324

Post UFE Leukorrhea



Persistent Vaginal Discharge

- 1-5% incidence
- Chronic discharge lasting > 8 weeks
- Flexible hysteroscopy demonstrates persisting sinus connecting to necrotic fibroid
  - May also be seen with MRI (pus or mucoid debris)
  - In office dilation of cervix may be helpful if loculated fluid
  - Observation
  - Resection of necrotic tissue be careful not to perforate

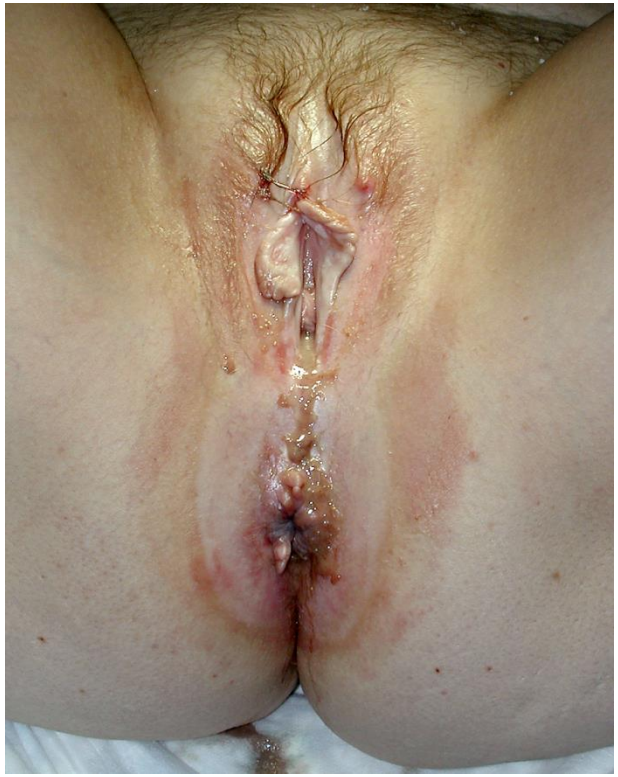
Burbank F. Are fibroids that become endocavitary after uterine artery embolization necessarily a complication? Am J Roentgenol. 2008;190(5): 1227-1230.

Walker, WJ. Persistent vaginal discharge after UAE. A J Ob Gyn 2004:190;1230-1233.

Vaginal Discharge/Leukorrhea

- Chronic fetid vaginal discharge
  - 4-7%
  - Fibroid extrusion from infarcted myomas into the endometrial cavity
  - 94% resolve spontaneously
    - Hysteroscopic resection may be needed
    - 10% spontaneous expulsion up to 18 months after UFE

Clinical Presentation of Post UFE Complications



From the collection of Dr. Linda Bradley

Necrotic Fibroid Expulsion After UFE

Possible symptoms

- **Leukorrhea**
  - **Clear, malodorous, copious, bloody, purulent**
- **Fever**
- **Cramping, “labor-like pain”, lower abdominal pain, pressure**
- **Protruding vaginal mass**
- **Elevated WBC count**

Rajan DK, et al. Risk of intrauterine infectious complications after UAE. JVIR 2004;15(12):1415-21.

AJR
WOMEN'S IMAGING

Are Fibroids That Become Endocavitary After Uterine Artery Embolization Necessarily a Complication?

Fred Burbank[1]

OBJECTIVE. This commentary deals with the study by Verma et al. discussing submucosal and endocavitary fibroids after uterine artery embolization (UAE).

CONCLUSION. UAE can infarct fibroids. Fibroids spontaneously infarct after childbirth. Because the postpartum cervix is patulous, infarcted fibroids that fall into the uterine cavity easily exit the uterus. Each patient contemplating UAE should anticipate that infarcted fibroids bordering on or inside the uterine cavity may require cervical dilatation or hysteroscopic resection for removal. The addition of either of these two gynecology procedures should not necessarily be regarded as a UAE complication or treatment failure.

AJR
WOMEN'S IMAGING

Submucosal Fibroids Becoming Endocavitary Following Uterine Artery Embolization: Risk Assessment by MRI

Sachit K. Verma[1]
Diane Bergin[1,2]
Carin F. Gonsalves[1]
Donald G. Mitchell[1]
Anna S. Lev-Toaff[1,3]
Laurence Parker[1]

OBJECTIVE. The purpose of our study was to assess the relationship between the endometrium and submucosal fibroids before and after uterine artery embolization (UAE).

MATERIALS AND METHODS. Contrast-enhanced pelvic 1.5-T MRI was performed in 49 women before and after UAE over a 2-year period. Dominant (largest diameter) fibroids in intramural, submucosal, subserosal, pedunculated subserosal, and endocavitary locations were assessed on pre- (baseline) and postembolization MRI. Size, locations of dominant fibroids relative to endometrium and serosa before and after embolization were compared. The ratio between the largest endometrial interface and the maximum dimension of the dominant submucosal fibroid (interface–dimension ratio) was determined on baseline MRI. The infarction rate for dominant fibroids was estimated after UAE.

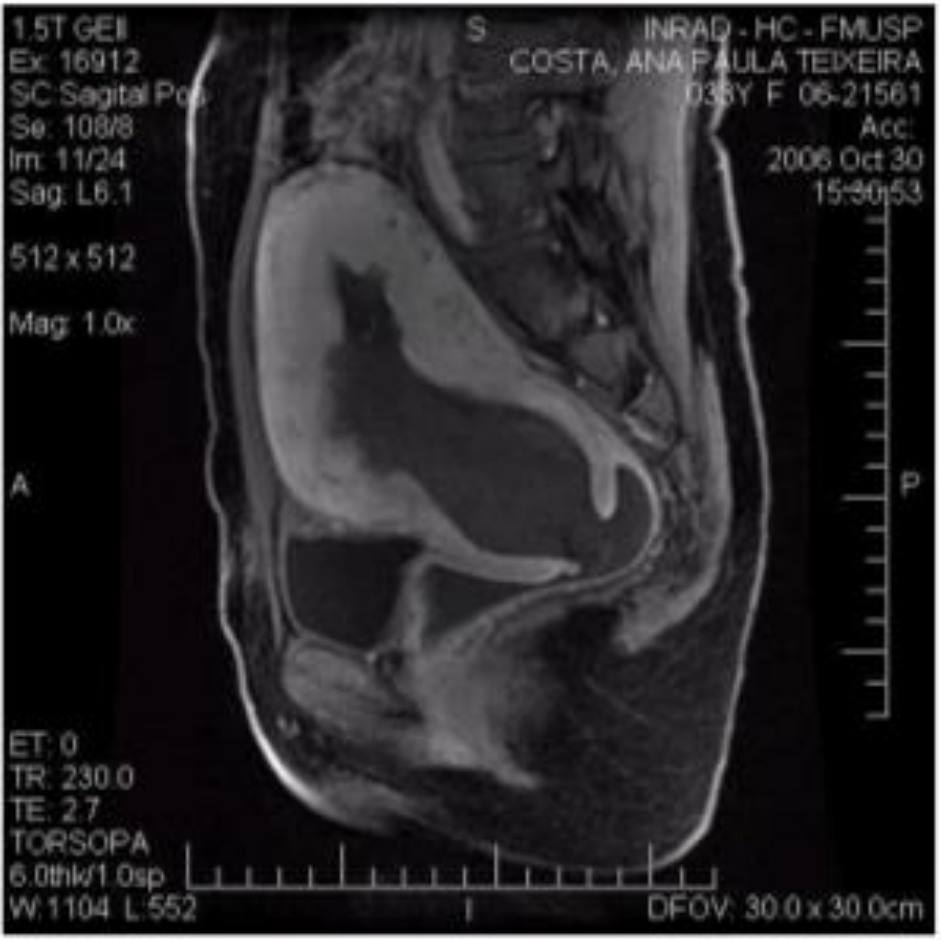
RESULTS. One hundred forty dominant fibroids were identified on baseline MRI. Forty-nine (35%) were intramural, 39 (28%) were submucosal, 34 (24%) were subserosal, eight (6%) were pedunculated subserosal, and 10 (6%) were endocavitary in location on preembolization MRI. After UAE, of 39 dominant submucosal fibroids, 13 (33%) became endocavitary: complete (n = 4), partial (n = 9) on the basis of European Society of Gynaecological Endoscopy (ESGE) classification. The preembolization mean interface–dimension ratio and mean diameters for dominant fibroids that became endocavitary were significantly greater than for those that did not become endocavitary after embolization (0.65 vs 0.32, $p < 0.005$; 8 vs 5.4 cm, $p < 0.05$, respectively). All dominant submucosal fibroids showed 100% infarction after UAE.

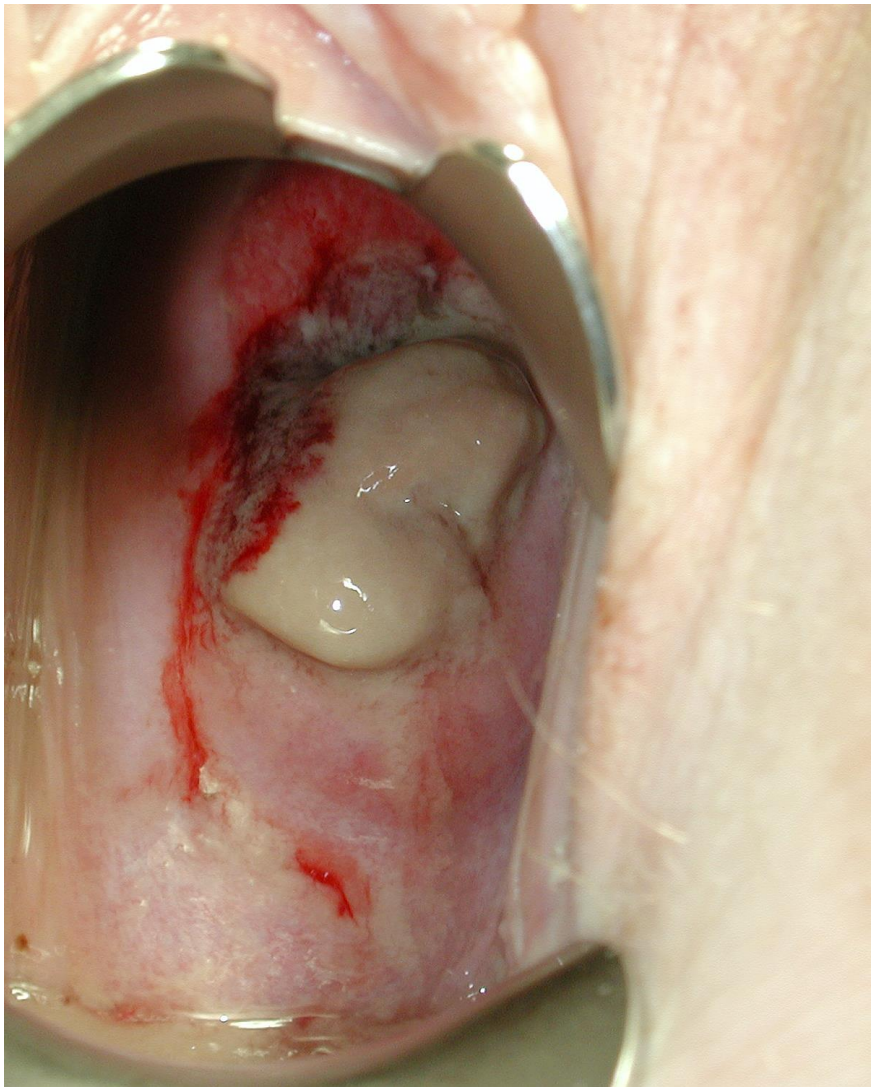
CONCLUSION. Submucosal fibroids with an interface–dimension ratio of greater than 0.55 are more likely to migrate into the endometrial cavity after UAE. The majority of these are expelled spontaneously without significant symptoms. Rarely, submucosal fibroids greater than 6 cm in size that become endocavitary may cause postprocedural complications requiring further intervention and medical treatment.

Necrotic Fibroid Expulsion After UFE

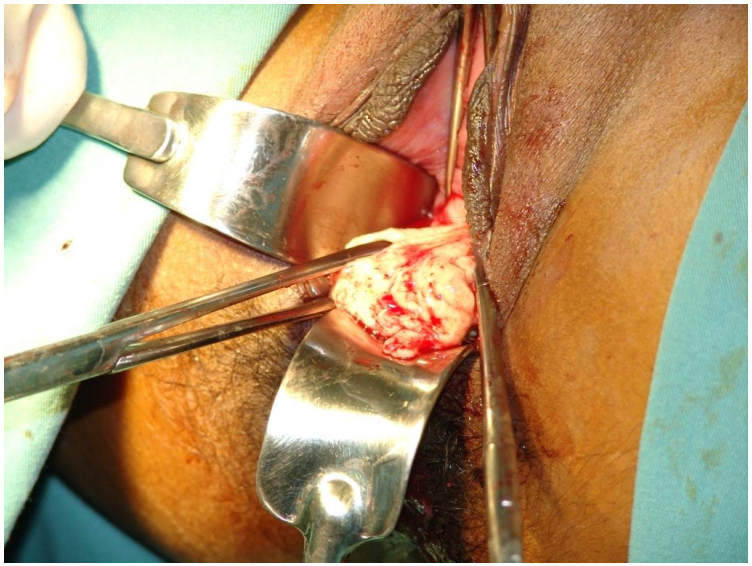
- Treatment
- Excellent visualization of the cervix
- If visualized at os, then ring forceps to remove necrotic material
- Perform hysteroscopy to determine if additional residual fibroids are seen

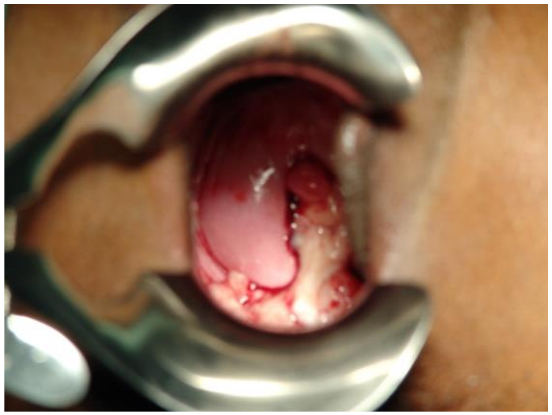
Prolapsing Leiomyoma

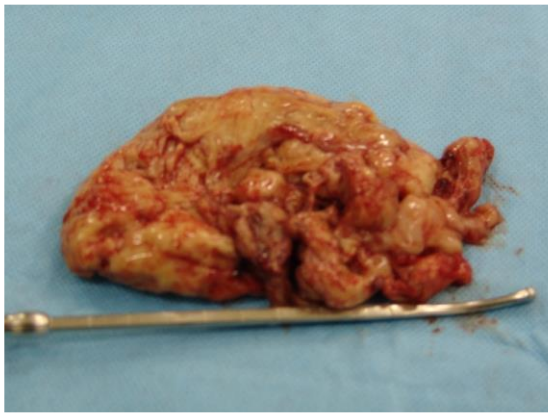




Prolapsing Leiomyoma



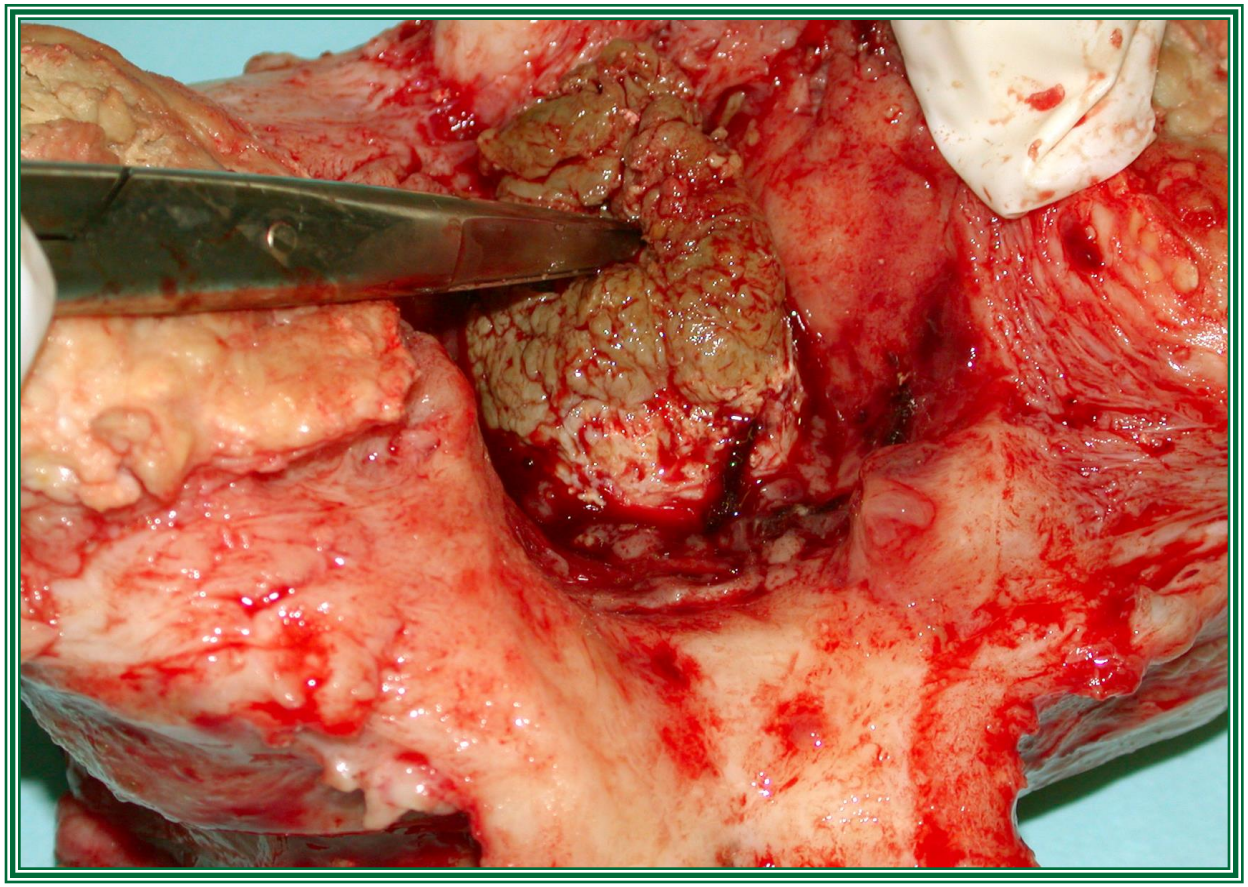




Vaginal Myomectomy

Must Still Perform Hysteroscopic To Determine if Residual Lesions are Present

Necrotic Endocavitary Fibroid and Leukorrhea



Eur Radiol (2005) 15: 1850–1854
DOI 10.1007/s00330-005-2700-6

UROGENITAL

Hye Ri Park
Man Deuk Kim
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Hee Jin Kim
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Mee Hwa Lee

Uterine restoration after repeated sloughing of fibroids or vaginal expulsion following uterine artery embolization

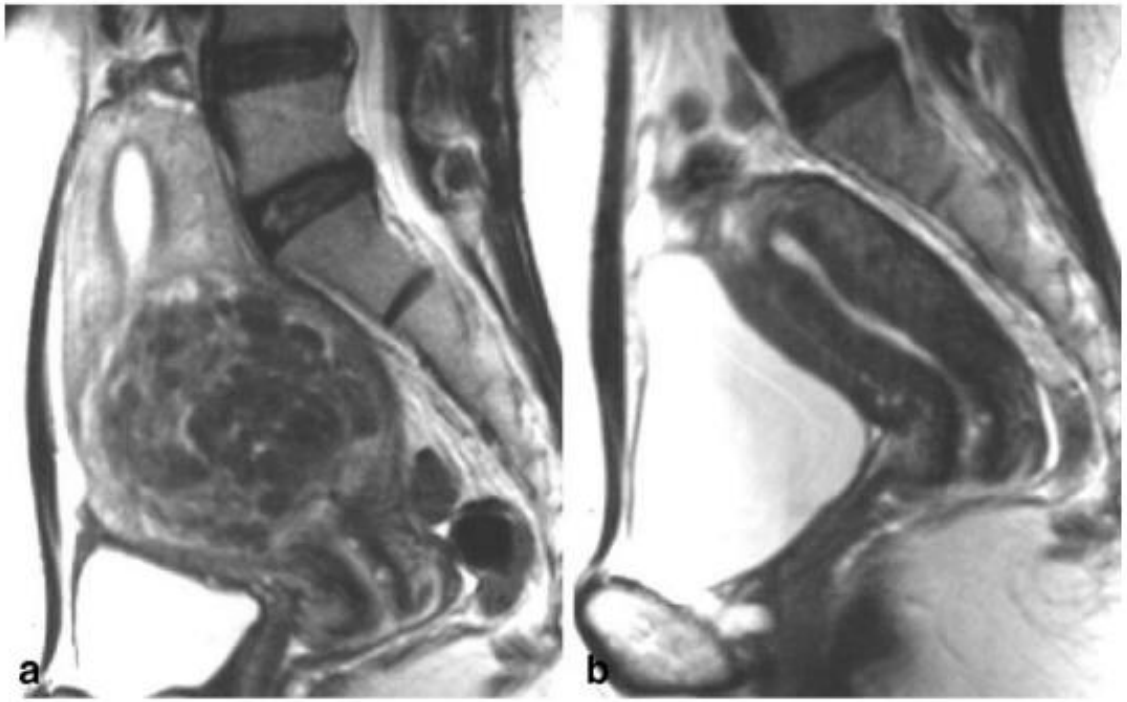
Abstract The aim of our study is to present our experience with uterine restoration after repeated sloughing of uterine fibroids or transvaginal expulsion following uterine artery embolization (UAE) and to determine its safety and outcome. One hundred and twenty four women (mean age, 40.3

The time interval from embolization to the uterine restoration was 7–150 days (mean 70.5 days). The clinical symptoms before and during vaginal sloughing or expulsion were lower abdominal pain (n=4), vaginal discharges (n=3), infection of necrotic myomas (n=2) and cramping abdom

Hye, R. et al. Uterine restoration after repeated sloughing of fibroids or vaginal expulsion following uterine artery embolization, Eur Radiol 2005:1850-1854.

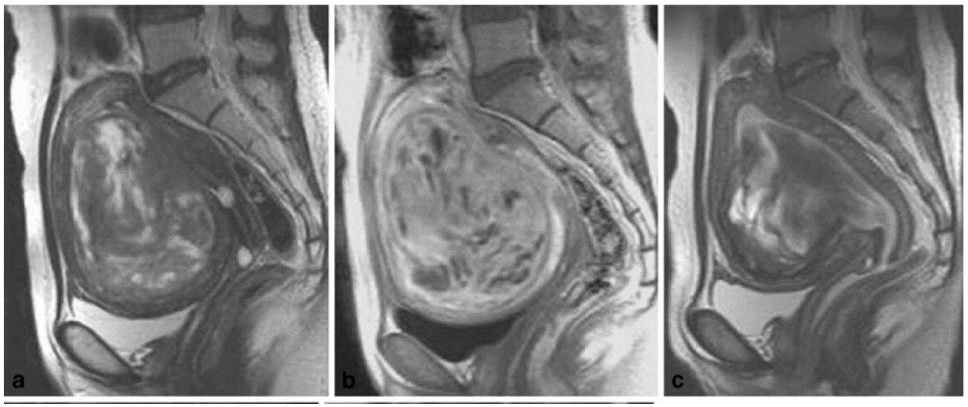
Uterine Restoration After Repeated Sloughing of Fibroids Or Vaginal Expulsion Following UFE

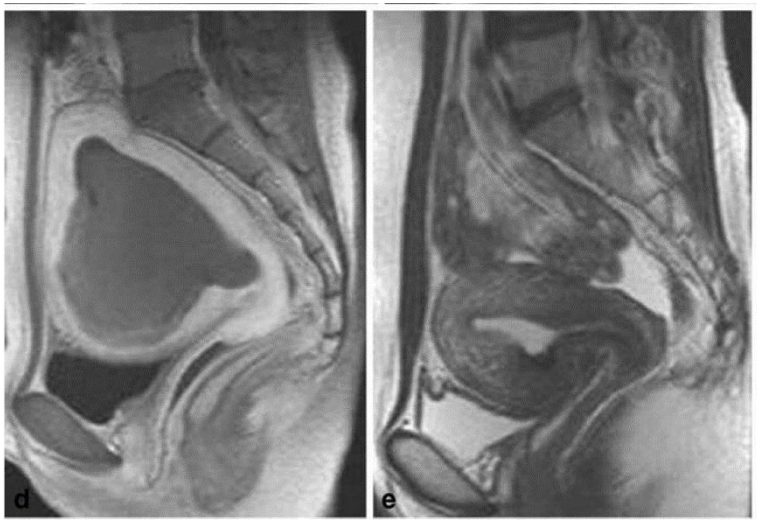
Fig. 1 A 41-year-old woman with a submucosal myoma. The T2-weighted sagittal image (**a**) shows a broad-based submucosal uterine myoma of about 7 cm. Follow-up MRI (**b**) 3 months after uterine artery embolization (*UAE*) indicated uterine restoration. The patient had repeated vaginal discharge with small pieces of tissue for 50 days



Hye, R. et al. Uterine restoration after repeated sloughing of fibroids or vaginal expulsion following uterine artery embolization, Eur Radiol.2005:1850-1854.

Uterine Restoration After Repeated Sloughing of Fibroids Or Vaginal Expulsion Following UFE

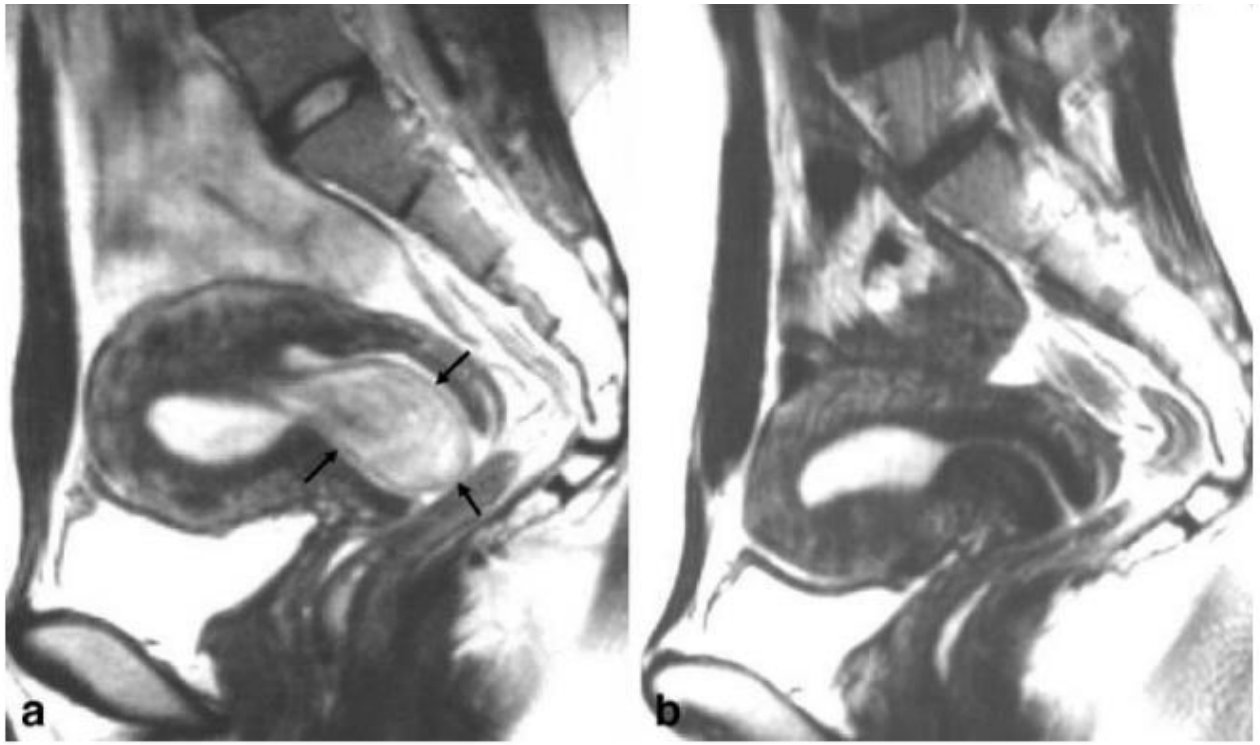




Hye, R. et al. Uterine restoration after repeated sloughing of fibroids or vaginal expulsion following uterine artery embolization. Eur Radiol 2005:1850-1854.

Uterine Restoration After Repeated Sloughing of Fibroids Or Vaginal Expulsion Following UFE

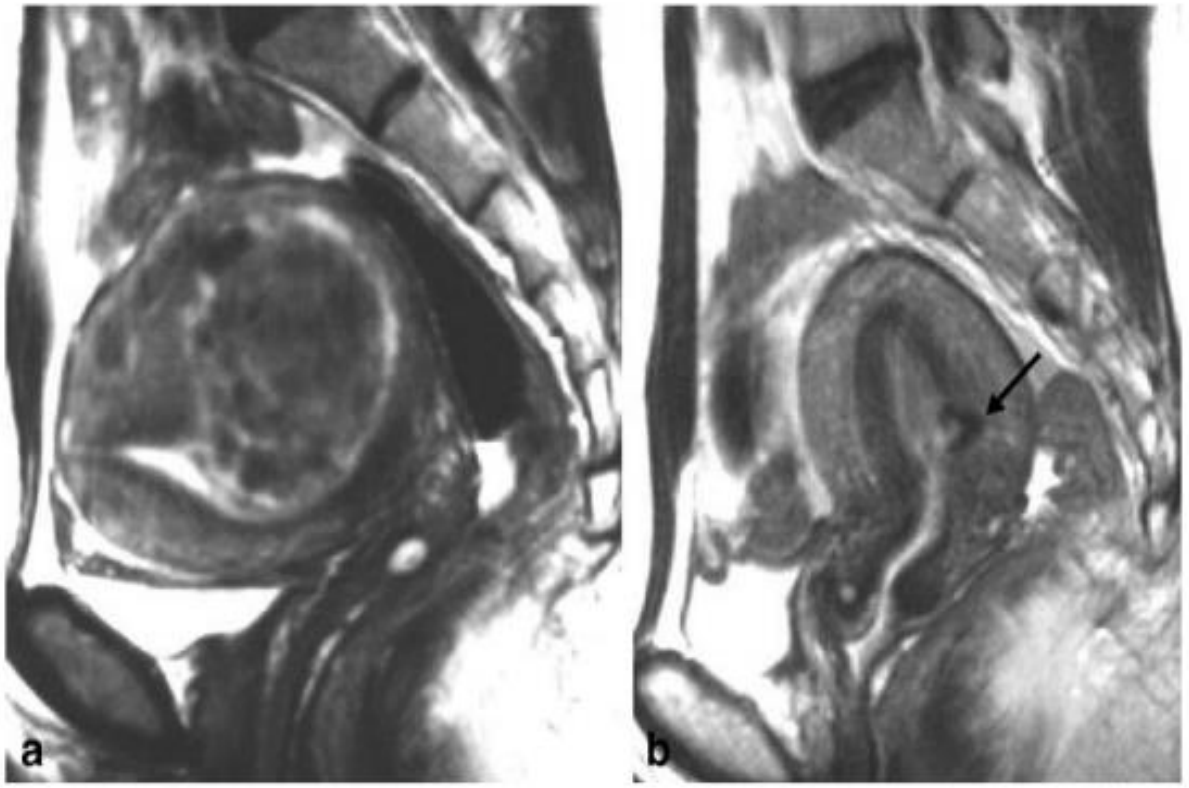
Fig. 2 A 32-year-old woman with a pedunculated myoma. The T2-weighted image (**a**) shows a 5-cm pedunculated myoma (arrows). After UAE, the myoma disappeared 7 days later (**b**)



Hye, R. et al. Uterine restoration after repeated sloughing of fibroids or vaginal expulsion following uterine artery embolization. Eur Radiol 2005:1850-1854.

Uterine Restoration After Repeated Sloughing of Fibroids Or Vaginal Expulsion Following UFE

Fig. 4 A 41-year-old woman with an intramural myoma. The T2-weighted image, shows a 6.5-cm intramural myoma (**a**). A localized uterine wall defect (*arrow*) representing ulceration (**b**) is seen following expulsion of the myoma



Hye, R. et al. Uterine restoration after repeated sloughing of fibroids or vaginal expulsion following uterine artery embolization. Eur Radiol 2005:1850-1854.

Complications: Infectious

- Mehta H. et al
  - 42 consecutive patients followed
  - Diameter of largest fibroid 9-16 cm
  - 85% pts African descent
  - Infectious complications seen from 1-29 weeks after UAE
- Cultures demonstrated
  - Anaerobic
  - Gram-negative
  - Coliforms (urine)

Mehta H. Review of readmissions due to complications from uterine Fibroid embolization. Clinical Radiology 2002:57(12):1122-4.

Complications

- Must be vigilant after UFE
- Special care observed for women on steroids, diabetic, or immunocomprimised
- If patient fails to respond to antibiotics and/or develops septic shock then hysterectomy necessary

Mehta H. Review of readmissions due to complications from uterine Fibroid embolization. Clinical Radiology 2002:57(12):1122-4.

Post-embolization Problems

- Passage of fibroid tissue fragments:
  - Small fragments not cause for concern
  - Large, visibly or palpably retained fragments may require removal especially if associated with persistent fever
    - Recommend examination under anesthesia
    - What you see may be the tip of an iceberg
  - Fragment passage has been reported as far out as 14 months - but usually within the first 2-3 weeks

Uterine fistula induced by hysteroscopic resection of an embolized migrated fibroid: a rare complication after embolization of uterine fibroids

Pierandrea De Iaco, M.D.,[a] Rita Golfieri, M.D.,[b] Tullio Ghi, M.D.,[a] Giuseppe Muzzupapa, M.D.,[a] Michela Ceccarini, M.D.,[a] and Luciano Bovicelli, M.D.[a]

S. Orsola Hospital, University of Bologna, Bologna, Italy

Objective: To describe a case in which hysteroscopic removal of a fibroid that had migrated through the uterine wall induced formation of a uterine fistula.

Design: After embolization of uterine fibroids, an investigative clinical, sonographic, and hysteroscopic protocol was followed.

Setting: Gynecologic clinic of a university hospital.

Patient(s): A 38-year-old woman undergoing embolization of uterine arteries for uterine fibroids.

Intervention(s): Angiography-guided transcatheter bilateral embolization of uterine arteries, with clinical, sonographic, and hysteroscopic follow-up.

Main Outcome Measure(s): Patient morbidity and satisfactory intercourse.

Result(s): Six months after embolization of the uterine arteries, the patient presented migration of the fibroid through the uterine wall. Hysteroscopic removal of the fibroid induced posthysteroscopic formation of a uterine fistula.

Conclusion(s): After embolization of the uterine arteries, thorough follow-up examination of the uterine cavity is strictly recommended. Diagnosis of a uterine wall perforation can identify an abnormal source of uterine bleeding, and patients should be counseled to avoid pregnancy until the lesion heals completely. (Fertil Steril® 2001;75:818–20. ©2001 by American Society for Reproductive Medicine.)

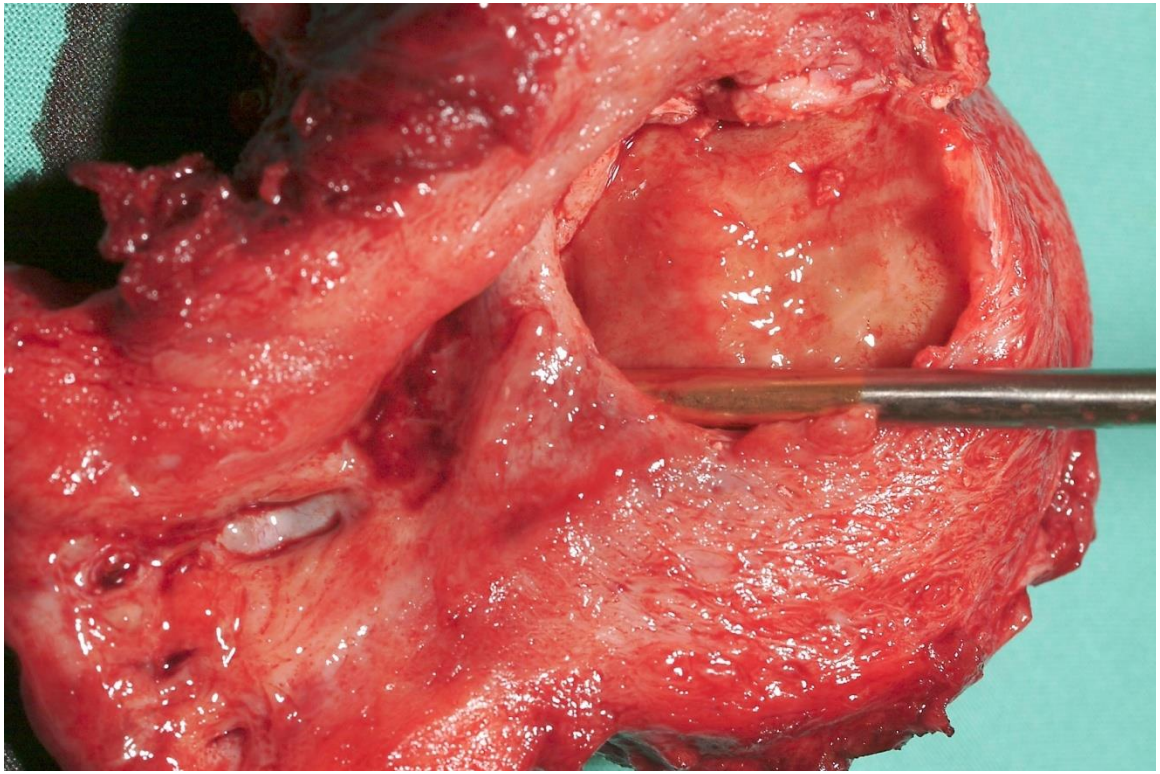
Key Words: Fibroids, embolization, hysteroscopy

Fibroids are the most common gynecologic tumor, occurring in approximately 20% of

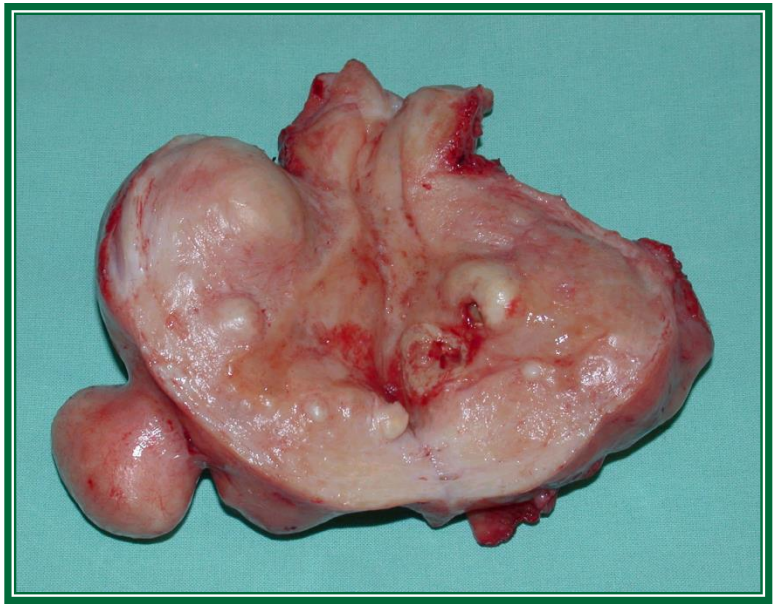
We report a case of a postembolization fistula induced by resectoscopic myomectomy.

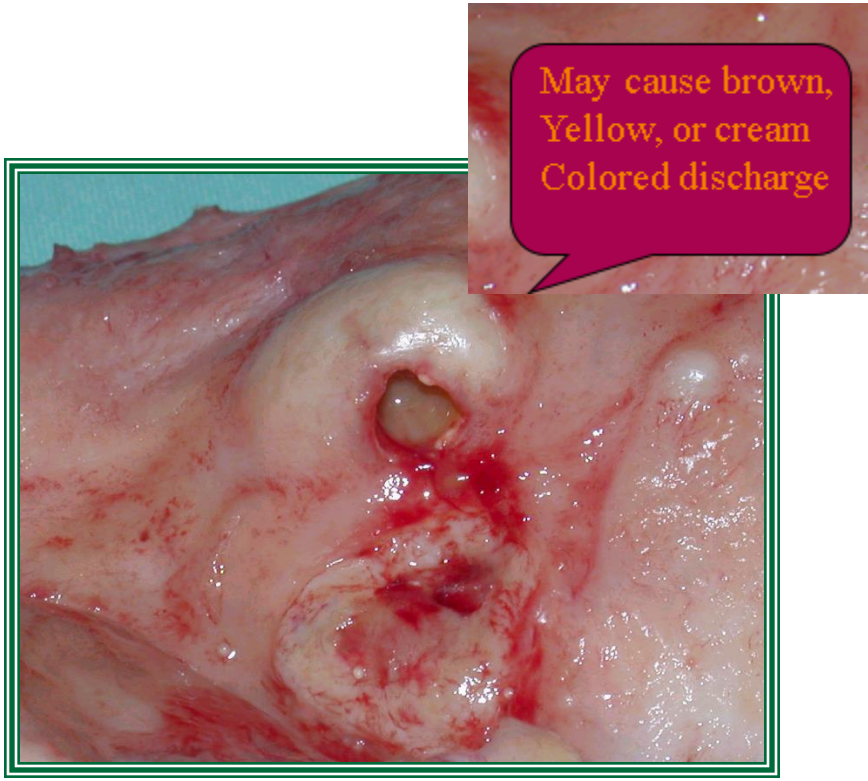
De Iaco P, et. al. Uterine fistula induced by hysteroscopic resection of an embolized migrated fibroid: a rare complication after embolization of uterine Fibroids.Fert. Steril. 2001:75(4):818-20.

Discontinuity of Endometrium: Chronic Leukorrhea



Postoperative Leukorrhea: Consider Hysteroscopic Resection Instead of Hysterectomy





From the collection of Dr. Linda Bradley

Labial Ulceration After UFE

- Rare occurrence
- Treat with topical lidocaine 5% ointment
- Estrace vaginal cream applied to vulva for 2-4 wks
- Healing is the norm

www.jeffersonhospital.org/fibroid from files of Dr. Jay Goldberg

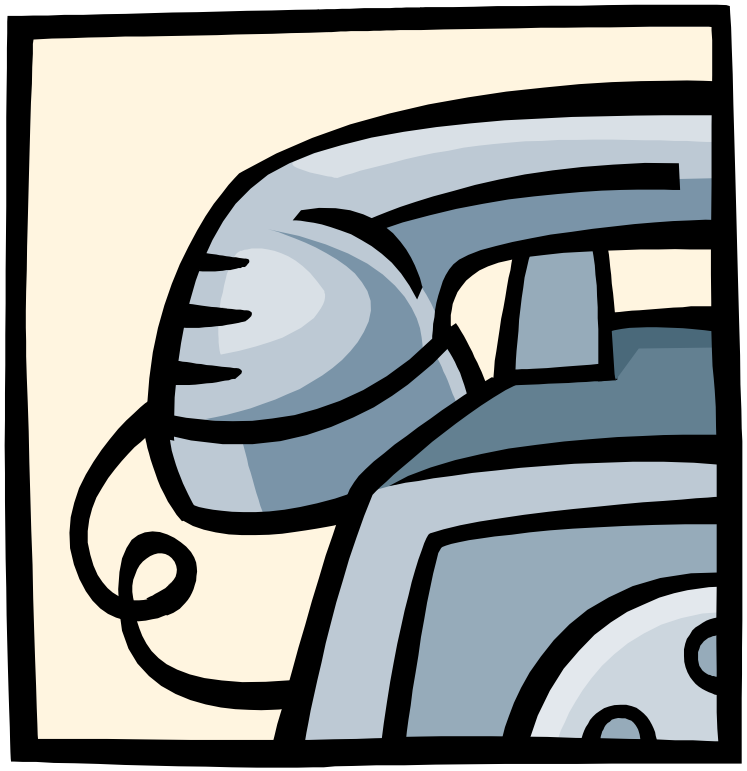
Postembolization Syndrome

- Consists of ischemic pain, nausea, vomiting, malaise, uterine tenderness low-grade temp
  - 15%-20% occurrence
  - May require readmission for management in 15% cases
- Usually within first 1-7 days
- Elevated wbc's >10,000 and left shift
- MRI helpful to distinguish between abscess and artifact
- Inconsistent reporting of complications due to size
  - Bigger volume does not always correlate with complications of pain or fever

Post-embolization Problems

- Passage of fibroid tissue fragments:
  - Small fragments not cause for concern
  - Large, visibly or palpably retained fragments may require office removal - especially if associated with persistent fever
  - Fragment passage has been reported as far out as 14 months - but usually within the first 2-3 weeks

When Patients Call—Listen and Respond



- Vaginal discharge
- Persistent temp >100.5F
- Passage of tissue
- Shortness of breath
- Persistent nausea, vomiting, constipation
- If symptoms are not improving over 7-10 days
- Worsening pain, new onset fever

Clinical Pearls

- Patients generally a getting better within 7 days
- Any set-backs need prompt evaluation
- Think about prolapsing fibroid when clinical symptoms better, then intense pelvic cramping/labor pain followed by watery discharge, serosanginous-brown discharge, increasing cramping and passage of tissue
- Sound uterus if copious discharge
- Liberal use of MRI or hysteroscopy can determine if necrotic or sloughing fibroid present
  - Operative hysteroscopic resection of fibroid and D&C can treat symptoms

What to Do When Problems Occur

- Must see the patient
- Avoid phone diagnosis
- Consistent evaluator if possible
- Evaluate for sepsis
  - CBC with platetets, coagulation profile, basic metabolic profile
- Pelvic exam, cultures (vaginal, cervical, blood)
- Visualize the cervix
- Imaging
  - CAT Scan
  - MRI

- Evaluate respiratory complaints to exclude pulmonary embolism

What to Do When Problems Occur

- Imaging
  - CAT scan
    - May demonstrate gas in the uterus (up to 2 wks after UFE)
    - Free fluid around the uterus
  - MRI
    - May demonstrate gas and free fluid
    - To determine if patient is passing a fibroid
    - May demonstrate pyometria
- IV antibiotics (most common organism cultured is E. Coli)
- Resort to hysterectomy when clinical symptoms do not improve with 24-36 hours, or patient is deteriorating

Clinical Pearls

- Uterine infection and ischemia
  - associated with uterine rupture
  - perforation may be associated with thinning of the uterine wall, as degeneration occurs
- Contrast-enhanced MRI may determine if adequate perfusion of the uterus has occurred
  - If necrosis is suspected, then hysterectomy should be promptly performed

When to Call it Quits

- Failure of symptom improvement at 6 months
- Worsening symptoms
- Growth of fibroids
- Persistent fevers

Complications of UFE and Their Frequency

- Premature menopause 2.4-15%
- Passage of submucosal fibroid 1.6-7%
- Infection necessitating hysterectomy 0.6%
- Groin hematoma 0.1-1%
- Post embolization syndrome 15-20%
- Arterial injury 1%
- Contrast/medication allergies 1%
- Chronic vaginal discharge 1-5%
- Readmission within 14 days of procedure 3.5%

Overall peri-operative morbidity = 5%

IR Related Complications

- Groin infection
- Groin hematomas
- Puncture site infection
- Arterial perforation by guide wire
- Thromboembolic
- Contrast allergy
- Contrast related renal failure
- Arteriovenous malformations
- Pseudoaneurysm
- Misembolization of abdominal vessels
- Radiation exposure

Approximately 1% procedurally related complications

Gynecological Reported Complications

- Infection
- Abscess
- Sepsis
- Hysterectomy
- Permanent amenorrhea
- Non-target embolization
  - Labial necrosis
  - Focal bladder necrosis
  - Gluteus muscle
- External sexual dysfunction
- Total uterine necrosis
- Vesicouterine fistula
- Uterine wall defects groin hematoma
- Pulmonary emboli
- Embolization of leiomyosarcoma
- Death (4 reported)
  - 2 from PE
  - 1 DIC, 1 septicemia

UFE: Potential Complications

- Pulmonary Embolism
- Need for gynecologic intervention <2.5%
  - prolapsing fibroids
  - prolonged purulent drainage
  - persistent pain
  - heavy bleeding
- Infection
  - systemic infection
  - endometritis
  - pyometritis
- Misembolization of target vessels
- Premature ovarian failure
  - <1-2% in women <45
  - 2-5% in women >45
- Persistent post-procedural pain
- Premature ovarian failure
- Anorgasmia
- Death
- Delayed diagnosis of leiomyosarcoma

Complications after UFE

- Serious complications in less than 2%
- Fibroid passage, associated with bleeding or infection
  - 2%, fibroid must have interface with endometrium
  - Most likely reason for readmission, gynecologic intervention.
- Mis-embolization rare: less than 1 in 500.
- Uterine infarction less than 0.5%, can lead to infection.
- Thromboembolic complications
  - Transient hypercoagulability occurs, similar to surgery.
  - Thrombosis rate 1 in 200 to 400.

- **Effectiveness**: UFE provides 85-95% symptom relief across
- ALL domains (bleeding, pain, bulk)
- **QOL**: Both UFE and surgery produce excellent QOL
- improvement; small myomectomy advantage at 2y disappears by 4y
- **Recovery**: UFE consistently 3-4x faster (1-2 weeks vs 4-6 weeks)
- **Reintervention**: UFE 24-32% vs Surgery 4-13% at 4-5 years - this is the trade-off
- **Safety**: Comparable or better complication rates vs surgery
- **Fertility**: MARA suggests myomectomy better but small numbers; observational data shows ~40% UFE pregnancy rate
- **Volume reduction**: Consistent 40-75% fibroid shrinkage
- **Long-term**: EMMY shows 69% avoid hysterectomy at 10 years durable results
- **Satisfaction**: 78-91% despite reintervention possibility
- **Size/Number**: Do NOT predict worse outcomes

Uterine Fibroid Embolization Summary

- UFE is proven effective with durable symptom control
- >200,000 UFE procedures worldwide
  - 14,000 ocedures performed per year in the United States
- 80-95% clinical success
  - bleeding and bulk-related symptoms
- Clinical studies show equivalent symptom relief as compared to surgery
  - with less recovery time and complications
- Minimally invasive

  < 23 hour hospital stay for most
- Low complication rate
- Prolapsing leiomyoma/leukorrhea may be associated with therapy and may be treated with operative hysteroscopy

Summary: Consistent Findings--All Trials Agree

1. **UFE significantly faster recover** than surgery (1-2 wks vs 4-6 wks)
2. **UFE shorter hospital stay** (same day, or 1 day vs 4-5 days—data for non MIGS procedures)
3. **UFE provides substantial symptom** relief (all trials show improvement)
4. **UFE preserves ovarian function** (FSH, AMH levels maintained)
5. **Comparable safety** (overall complications rates similar)
6. **Higher reintervention rate with UFE** (all trial show this pattern

FINAL KEY MESSAGE

- **UFE is NOT just for bleeding - it's a comprehensive treatment for ALL fibroid symptoms:**
- ✅ Heavy bleeding - 83-96% improvement
- ✅ Bulk symptoms - 94% improvement
- ✅ Urinary issues - 86-92% improvement
- ✅ Pelvic pressure - 94% improvement
- ✅ Cosmetic concerns - Visible reduction
- ✅ Pain/dyspareunia - 71-94% improvement
- **If the symptoms are caused by fibroids, UFE can improve them - regardless of whether it's bleeding, bulk, or both.**

THE WIN-WIN MESSAGE

- **UFE doesn't replace your surgical expertise - it complements it.** By offering your patients a comprehensive menu of options, including minimally invasive alternatives when appropriate, you demonstrate patient-centered care that builds loyalty and reputation.
- **The gynecologists who embrace collaborative UFE programs don't lose patients** - they gain recognition as physicians who put patient preferences first.
- The question isn't whether UFE works - **25 years of data prove it does.**
- The question is: ***Will you be the gynecologist who ensures your patients have access to all appropriate options? Can you build a collaborative practice with your interventional radiologist?***

REFERENCES

The REST Investigators, "Uterine Artery Embolization vs. Surgery for Symptomatic Uterine Fibroids; *The New England Journal of Medicine* (January 2007)

Pinto, I., et al. (February 2003). Uterine Fibroids: Uterine Artery Embolization versus Abdominal Hysterectomy for Treatment – A Prospective, Randomized, and Controlled Clinical Trial. *Radiology, 226,* 425-431.

Spies, J.B., et al. (November 2005). Long-Term Outcome of Uterine Artery Embolization of Leiomyomata. *Obstetrics & Gynecology, 106,* 933-939.

Spies, J.B., et al. (March 2004). Outcome of uterine embolization and hysterectomy for leiomyomas: Results of a multicenter study. *American Journal of Obstetrics and Gynecology, 191,* 22-31.

Goodwin, S.C., et al. (January 2006). Uterine artery embolization versus myomectomy: a multicenter comparative study. *Fertility and Sterility, 85,* 14-21

Spies, J.B., et al. (December 2005). FIBROID Registry Investigators. The FIBROID Registry: symptom and quality-of-life status 1 year after therapy. *Obstetrics and Gynecology, 106,* 1309-1318.

References

Ghant MS, Sengoba KS,et. al. Beyond the physical: a qualitative assessment of the burden of symptomatic uterine fibroids on women's emotional and psychosocial health. J Psychosom Res 2015;78:499-503.

Mara, M. et. al. Hysteroscopy after uterine fibroid embolization: Evaluation of intrauterine findings in 127 patients. J. Obstet. Gynaecol Res.;2012;38(5):823-831.

Hye, R. et al. Uterine restoration after repeated sloughing of fibroids or vaginal expulsion following uterine artery embolization. Eur Radiol.2005:1850-1854.

Rajan DK, et al. Risk of intrauterine infectious complications after UAE. JVIR 2004;15(12):1415-21.

Walker WJ, et al. Pregnancy after UFE for leiomyomata: a series of 56 completed pregnancies. Am J Obstet Gynecol 2006;1;95(5) 1266-1271.

De Iaco P, et. al. Uterine fistula induced by hysteroscopic resection of an embolized migrated fibroid: a rare complication after embolization of uterine Fibroids.Fert. Steril. 2001:75(4):238-244.

Walker, WJ. Persistent vaginal discharge after UAE. A J Ob Gyn 2004:190;1230-1233.

Burbank F. Are fibroids that become endocavitary after uterine artery embolization necessarily a complication? Am J Roentgenol. 2008;190(5): 1227-1230.