Uterine Fibroid Embolization: A Case Based Introduction

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Agenda

I. Patient Presentation
II. Discussion
   A. What are Fibroids?
   B. Signs and symptoms
   C. Treatment Options
   D. Uterine Artery Embolization as a Treatment Procedure
   E. Literature Review
Our Patient

- 48 y.o. F, G0P0, consulting for several years history of severe menorrhagia secondary to known fibroid uterus. Patient had developed severe anemia requiring parenteral iron therapy, and control of symptoms was unsuccessful with oral contraceptive pills
- Except for enlarged uterus, essentially normal physical exam
Sagittal Pelvic MRI

fibroids
Diagnosis: Multiple Uterine Fibroids, predominantly of the Intramural Type
Fibroids

• Benign tumors of uterine smooth muscle
• uterine fibroid = leiomyoma/fibromyoma
• not considered to be pre-cancerous
• may arise in various parts of the uterus
• single most common cause for hysterectomy

From www.ufecenter.com
Fibroids

- Fibroids are named according to their position in the uterus: submucosal, intramural and subserosal
Fibroids

- most common tumor of the pelvis in females
- 20 to 25% of women of childbearing age
- arise at menarche and regress after menopause, suggesting estrogen dependence
- only a minority are symptomatic (estimated at 10-30%)
- cause unknown, but more common in nulliparous middle aged females, African-Americans, and overweight women
Signs and Symptoms

- menorrhagia/metrorrhagia/ menometrorrhagia
- dysmenorrhea; dyspareunia
- frequent urination caused by a large tumor pressing against the bladder
- backaches or constipation from pressure on the bowel
- rarely, a sudden pain in the lower abdomen
- small fibroids may go unnoticed for years
- infertility?
Treatment options

• How are uterine fibroids currently treated?
  – Small and/or no symptoms: no treatment; regular follow-up with US and pelvic exam
  – if with symptoms, various treatments are available...
Treatment options

• Medical management
  – NSAIDS, oral contraceptives, progesterones, GnRH agonists (Lupron)
  – pros: non-invasive, may shrink fibroids
  – cons: cause not eliminated with NSAIDS; infertility with contraceptives; Lupron use usually limited to 6 months, may induce premature menopause and osteoporosis
Surgical management

- **myomectomy**
  - myomectomy apparently successful in about 80% of cases
  - pros: fertility can be preserved; well established procedure
  - cons: risk of post-op bleeding, only part of uterus is treated and recurrence can occur; not all fibroids amenable; adhesions can lead to infertility

From www.isisfertility.com
Surgical management

- Hysterectomy
  - pros: 100% curative, no risk of future cancer, well established procedure
  - cons: major surgery with potential surgical complications, emotional effects, diminished sexual function, long recovery
Surgical Management

- Hysteroscopic resection
  - possible if fibroids are submucous and projecting into uterine cavity
  - cons: only a small subset of patients are candidates; risk of recurrence

From www.fibroidworld.com
Uterine Fibroid Embolization

- Embolization of uterine arteries for severe post-partum or post-traumatic hemorrhage performed for nearly 20 years now
- In 1990: Jacques-Henri Ravina, a French gynecologist, began performing embolization prior to hysterectomy to decrease surgical blood loss
- however, patients noticed improvement of symptoms and would cancel surgery
Who is a Candidate for UFE?

- Symptomatic patients seeking non-surgical treatment
- Fibroids as definitive diagnosis
- Uterine Size of less than 20 weeks (below umbilicus)
- Patient off GnRH for 8 weeks prior to UFE (relative)
UFE: Procedure

- Uses angiographic techniques to place a catheter into uterine arteries
- Patient under conscious sedation and local anesthesia

From www.ufecenter.com
UFE: Procedure

- Arterial access via a needle puncture into femoral artery
- Catheter advanced over aortic bifurcation and into the uterine artery on the side opposite the puncture

From www.fibroidoptions.com
UFE: Procedure

• Before embolization, an arteriogram is performed to check patency of vessels and provide a roadmap of the blood supply to the uterus and fibroids
Review of Pelvic Vasculature

From http://esap.stanford.edu
Aortogram (runoff study)

- Aortic bifurcation
- Common iliacs
  - R Internal Iliac
  - L Internal Iliac
  - R External Iliac
  - L External Iliac
L uterine artery

L internal iliac

Iliac arteries (RPO)
Selective arteriogram of L uterine artery

Feeding vessels

catheter

L uterine artery
Selective Arteriogram of L uterine artery (mid to late phase)
UFE: Procedure

- Polyvinyl alcohol particles are injected to block blood flow to fibroids
- Caseous necrosis results, followed by hyaline sclerosis

From www.fibroidoptions.com
Polyvinyl Alcohol

- Most common nonabsorbable particulate agent currently in use.
- Prepackaged polyvinyl alcohol particles (Ivalon, Biodyne, Contour Emboli) are provided in a range of sizes, from 150 to 1000 microns.
- Smaller particle sizes are most frequently used in the embolization of vascular tumors.
- Larger sizes are more useful in the occlusion of larger, high flow vascular malformations.
Polyvinyl Alcohol

• the extremely irregular surface of each particle creates a high coefficient of friction, which often results in adhesion of the particles to the wall of the vessel

• Blood flow is usually eliminated

• The clot that forms between the particles may eventually recanalize. This limitation can be partially overcome by packing the vessel with higher concentrations of small PVA particles followed by more proximal occlusion with larger particle sizes or microcoils.
Selective Arteriogram of L Uterine Artery Post Embolization

Cessation of flow
Selective occlusion of L uterine artery

Selective Arteriogram of L Uterine Artery Post Embolization
UFE: Procedure

- Both uterine arteries are embolized to ensure that entire blood supply to fibroids is blocked
- done using either single or double catheter technique
Selective Arteriogram of R Uterine Artery Pre Embolization
Selective Arteriogram of R Uterine Artery Pre Embolization

“blush” showing prominent blood supply
Selective Arteriogram of L Uterine Artery Post Embolization

Cessation of flow through R uterine artery
What to Expect After the Procedure

- Post-embolization Syndrome
- Pelvic pain accompanied by flu like symptoms, persisting for a few days to a few weeks
- Due mainly to release of toxins from tissue necrosis
- Well controlled by pain medications
What to Expect After the Procedure

- Size of the fibroids and the uterus diminish slowly with time with the maximum effect seen within the first 6 months (typically, within 2-3 months)
- Menstrual cycles will be interrupted and will be abnormal for a period of 3-4 months
- Most women, but not all, will have return of normal menses
Complications

- Serious complications rare, less than 4% of patients
- Only 2 deaths reported out of almost 10,000 patients treated worldwide so far
  - 1 death from septicemia
  - 1 death from pulmonary embolism
- Other potential complications include femoral hematoma, allergic reactions, vessel injury, infection and sexual dysfunction
Possible causes of complications:

- Fibroids fed by a single uterine artery in tandem with the contralateral ovarian artery
  - in this case, both may be embolized, but with risk of inducing menopause
- Complete misembolization of ovarian artery
  - Leads to premature menopause

From www.uterinefibroids.com
Controversies

- Exposure of the Ovaries to Radiation?
- Fertility status post embolization?
- Long term effects of PVA particles in body?
References

- Spies JB. Uterine Artery Embolization: Literature Review. Http://www.fibroidoptions.com
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