Uterine Fibroids
uncommon approaches to a common problem

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What are Uterine Fibroids?

- Benign growths that occur in or around the uterus
- Most common type of pelvic growth
- Cumulative incidence: 65-70%
- Originate from a single cell within the muscle layer, or myometrium, of the uterus
- Contain smooth muscle and fibrous tissue
What are Uterine Fibroids?

- **Synonyms:**
  - Myoma
  - Leioma
  - Leiomyoma
  - Fibromyoma
  - Leiofibromyoma
  - Fibroleiomyoma
What are Uterine Fibroids?

- Most frequent indication for hysterectomy in pre-menopausal women
- Over 200,000 hysterectomies are performed annually in the U.S. due to fibroids
Types of Uterine Fibroids

- Described by their location, number, and size
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  - **Interligamentous**
  - **Parasitic**
Types of Uterine Fibroids

- **Number:**
  - Single
  - Multiple

- **Size:**
  - Microscopic to extremely large
  - Record: 141 pounds (64 kg)
Who is at Risk for Fibroids?

- Most common in women between ages 30 and 50
- Risk Factors:
  - African American
    - 2-3 fold greater incidence than in Caucasians
    - Larger, more numerous, and grow more quickly
    - Symptoms present four to five years earlier
  - Obesity
  - High Blood Pressure
  - Alcohol Use (in women who drink > 7 beers/week)
  - Smoking
  - Pelvic Infection
  - Stress
  - Uterine Injury
Do Hormones Play a Role?

• Estrogen
  • Fibroids do not develop before the body begins producing estrogen
  • Rapid growth with use of oral contraceptives and during pregnancy
  • Decrease in size after menopause

• Progesterone
  • Decreased size with use of progesterone inhibitors
Symptoms

25% of women with fibroids will develop symptoms:

- **Changes in menstruation**
  - Longer, more frequent, or heavy menstrual periods
  - Menstrual pain (cramps)
  - Vaginal bleeding at times other than menstruation
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  - Dyspareunia
- **Pressure**
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  - During sex
- **Pressure**
- **Difficulty or frequent urination**
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- Abdominal cramps
- Enlarged abdomen
- Infertility
- Miscarriages
Diagnosis

- Screening Tests
  - Pelvic Exam
  - Ultrasound
  - Saline Sonohysterogram (SSH)
  - Hysterosalpingogram (HSG)

- Advanced Imaging Studies
  - MRI (magnetic resonance imaging)
  - CT Scan (computerized tomography)

- Surgery
  - Hysteroscopy
  - Laparoscopy
  - Laparotomy
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Treatment Options

- Relief of symptoms is the major goal
- Type and timing of any intervention should be individualized based upon:
  - Size
  - Location
  - Number
  - Severity of symptoms
  - Reproductive goals
  - Medical history
Expectant Management

- Fibroids without symptoms require no treatment
  - Imaging study to rule out ovarian mass
  - Follow with routine pelvic exam and/or ultrasound
  - Rapid growth not related to risk of sarcoma

- Prophylactic therapy to avoid future symptoms is not recommended
  - Exception: women who are contemplating pregnancy with fibroids that distort the uterine cavity or are of significant size
Medical Therapy

- Lack of data to support most forms
- Most helpful when bleeding is primary symptom (little or no effect on size-related symptoms)

- In general:
  - 75% see some improvement after one year
  - Long-term failure rates are high
  - 60% pursue another form of therapy after 2 years
Medical Therapy

- Therapies to control bleeding:
  - Oral contraceptive pills / Progesterone pills
  - Progesterone secreting intrauterine device
- Therapies to decrease estrogen
  - GnRH agonists (lupron) or antagonists
  - Aromatase inhibitors
  - SERMs (raloxifene)
- Therapies to decrease progesterone
  - Anti-progesterone agents (mifepristone)
  - Androgens (danazol)
- NSAIDs
Uterine Artery Embolization (UAE)

• Minimally-invasive procedure in which a small catheter is guided directly to the fibroid's blood supply

• Catheter emits small particles (embolic agents) into the uterine artery, which occlude the arteries that feed the fibroids
Uterine Artery Embolization (UAE)

- 70 - 90% - significant or total relief of heavy bleeding
- 60 - 85% - relief of pelvic pain
- Average reduction in size ranges from 40–50%
- Effects takes place over a 6 to 9 month time frame
Uterine Artery Embolization (UAE) Experience

- Over 50,000 UAE procedures have been performed worldwide since 1997
- Long-term (10-year) data is not yet available
- 6-year data shows good long-term benefit
Uterine Artery Embolization (UAE) Fertility

- Ideal candidate is perimenopausal woman who has completed childbearing or is not a surgical candidate
- There have been numerous case reports (~150) of normal pregnancies following UAE
- Long-term effects of UAE on pregnancy are still unknown
Uterine Artery Embolization (UAE)
Side Effects

- Post-embolization syndrome
  - Pain, cramping, nausea, malaise, low grade fever and elevation of the white blood cell count
  - Varies in severity and is self-limiting lasting 4-5 days
  - Treatment is supportive - pain and anti-nausea medications
- Non-target embolization
  - Particles inadvertently flow into arteries feeding other tissues
  - Premature ovarian failure
  - Occurs in 1 - 3% of cases
Magnetic Resonance Guided Focused Ultrasound (MRgFUS)

- a.k.a. High Intensity Focused Ultrasound (HIFU)
- Experimental (FDA approved in 2004)
- Non-invasive outpatient procedure that uses high intensity focused ultrasound waves to destroy fibroid tissue by generating heat
Magnetic Resonance Guided Focused Ultrasound (MRgFUS)

- Symptomatic improvement in first 3 months with >2 years of follow-up
- Short term morbidity is low
- Rapid recovery
- Time consuming and costly
- Intended for women who have completed childbearing
Surgery

• Mainstay of therapy for fibroids
  • Hysterectomy
    • Removal of fibroids and uterus
  • Myomectomy
    • Removal of fibroids with sparing of the uterus
    • Hysteroscopy for fibroids inside the uterus
    • Abdominal approach for fibroids outside the uterus
    • Fertility, recurrent pregnancy loss, or uterine preservation desired
Surgical Approach

Primary goal is to achieve the best possible surgical result using the least invasive procedure possible.
Hysterectomy

• Most common female surgery
  • 650,000 procedures annually
  • Fibroids account for 30% of hysterectomies in white women and 50% in black women

• Eliminates chance for recurrent symptoms

• Indications:
  • Acute hemorrhage that doesn't respond to less invasive therapies
  • Women who have completed childbearing and are at increased risk for other disease that would be eliminated or decreased by hysterectomy
  • Women who have completed childbearing, have failed less invasive therapies, and desire definitive treatment of their symptoms
Myomectomy

- > 40,000 procedures annually
- Indicated for women who have not yet completed childbearing or otherwise wish to retain their uterus.
- Treatment for recurrent pregnancy loss
- Risk of unplanned hysterectomy < 1%
- Risk of recurrence
  - After 5 years, 50-60% will have new myomas detected by ultrasound
  - 10-25% will require a second surgery
Myomectomy – Hysteroscopy

- Procedure of choice for submucosal fibroids
- Excellent relief of symptoms
  - < 16% requiring repeat surgery in 9 year follow up
- Fertility rates following resection are excellent
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Myomectomy – Laparoscopy vs. Laparotomy

Does the surgical approach affect fertility?

- Pelvic adhesions cause infertility
  
  *Human Reproduction Update. 7(6):567-76, 2001*

- Laparoscopy causes fewer pelvic adhesions than open incisions
  
  *Surgical Endoscopy. 18(6):898-906, 2004*
Myomectomy – Laparoscopy vs. Laparotomy

- First multicenter RCT comparing reproductive outcomes in laparoscopic vs minilaparotomic myomectomy
- 136 patients with unexplained infertility and either a symptomatic or asymptomatic myomata
- Outcomes measured:
  - Fecundity
  - Time to first pregnancy
  - Cumulative pregnancy rate
  - Live birth rate
- All parameters significantly better following laparoscopy in patients with symptomatic myomata and improved in patients with unexplained infertility

Polomba et al. Fertility and Sterility, 2007
Fibroids and Fertility

- Mechanisms by which fibroids may adversely affect fertility:
  - Displacement of the cervix
  - Enlargement or deformity of the uterine cavity
  - Obstruction of the fallopian tubes
  - Altered tubo-ovarian anatomy
  - Disordered uterine contractility
  - Disruption, atrophy or inflammation of endometrium over or opposite a submucous myoma
  - Impaired endometrial blood flow
  - Diminished ovarian blood flow
Fibroids and Fertility

- Prospective cohort study in women with unexplained infertility looked at cumulative pregnancy rates without intervention over 12 months\(^1\)
  - 11% of women with fibroids
  - 42% of women with fibroids who underwent laparoscopic myomectomy

- In IVF, implantation rates are lower when the myomas are:
  - Distorting or displacing the uterine cavity\(^2,3\)
  - Greater than 3 or 5 cm in diameter, either alone or in aggregate\(^4,5\)

1. Donnez et al, Hum Reprod, 2002
Fibroids and Pregnancy

- Fibroids are observed in 2.7 – 12.6% of pregnant women\(^1\)
- Steroid-driven growth of fibroids greatest in first trimester, and many may shrink later in pregnancy\(^2,3\)
- 60-80% do not grow during pregnancy
- 20-30% develop complications:
  - Malpresentation \text{OR} 2.9 (CI, 2.6 – 3.2)
  - Cesarean section \text{OR} 3.7 (CI, 3.5 – 3.9)
  - Preterm delivery \text{OR} 1.5 (CI, 1.3 – 1.7)
  - Spontaneous miscarriage \text{OR} 1.6 (CI, 1.3 – 2.0)
- Spontaneous miscarriage rate among 1,941 women with fibroids\(^4\):
  - 41% in women prior to myomectomy
  - 19% in women following myomectomy

2. Lev-Taoff et al, Radiology, 1987
Patient Selection for Laparoscopy

- Enhanced MRI study
  - Define tumor number, size and location(s)
  - Rule out adenomyosis
  - Plan total robotic vs robot-asisted approach

- Robotic vs Robotic-Assisted Myomectomy
  - Robotic Myomectomy: da Vinci® system used to perform entire surgery
  - Robot-Assisted Myomectomy: Conventional laparoscopic myomectomy followed by robotic reconstruction of uterine incisions
Patient Selection for Laparoscopy

• **Inclusion criteria (117 cases)**
  - Single myoma $\leq 15$ cm
  - Up to 15 myomata, depending on size/location
  - Each case should be evaluated individually after MRI
  - Pretreatment with GnRH agonists may be employed

• **Exclusion criteria (vary greatly with experience)**
  - Fundus above umbilicus
  - Adenomyosis (not adenomyomata)
  - Uterine cavity not visualized by MRI
Summary

- Fibroids are common benign tumors that originate from the uterus.
- Most do not cause symptoms, but they can present in a variety of ways that range in severity.
- Several treatment options are available, and should be individualized based on each patient's symptoms and life goals.
- Surgical approach should aim to achieve the best possible result using the least invasive procedure possible.