Myometrium Echogenicity

Normal myometrium has a smooth even texture throughout.

Inhomogeneous Myometrium

- Transient
- Real

Myometrium Echogenicity

Myometrium Echogenicity
**Inhomogeneous Myometrium**

- **Densities**
  - Small, focal, well defined

- **Lucencies** or holes
  - Vessels – flow
  - Cysts – no flow

- **Masses**
  - Discrete with a border – fibroid
  - Ill-defined – adenomyosis

---

**Endo/Subendometrial Densities**

- **Focal Densities**
  - Subendometrial
  - Placental site nodule

- **Myometrium**
  - Fibroid, Scar, IUD

- **Outer myometrium**
  - Arcuate Calcification

---

**Placental Site Nodules**

- Focal echodensity at endo-myoo junction
- Probably persistent site of prior implantation
- Found in women with at least 1 pregnancy
- A benign microscopic lesion of intermediate trophoblast
  - No reports of GTD or malignancy
  - Microscopically: well-circumscribed nodules

---

**Endo/Subendometrial Densities**

- Most are variants of normal
- Most are clinically insignificant
**Myometrium Densities**

Transabdominal  Transvaginal

**Myometrium Densities**

Normal

**Myometrium Densities**

43 y/o G0P0
intermenstrual bleed + pain

Right arm extends into the myometrium

**Outer Myometrium Arcuate Artery Calcifications**

- May be seen in older women as symmetric calcified punctate structures
- Associated with
  - Diabetes
  - Hypertension
**WHO Classification of Uterine Tumors**

- Epithelial
  - Endometrial carcinoma
  - Endometrial hyperplasia
  - Endometrial polyp
- Mesenchymal
  - Endometrial stromal sarcoma
  - Leiomyosarcoma
  - Smooth muscle tumor of unknown malignant potential
  - Leiomyoma
- Mixed epithelial & mesenchymal
  - Carcinosarcoma
  - Adenosarcoma
  - Adenomyoma
  - Gestational trophoblastic disease
- Lymphoma
- Metastatic disease
- Miscellaneous
  - Sex cord-like tumors
  - Neuroectodermal tumors

**Diagnostic Challenge**

**Uterine Leiomyoma**

- Benign neoplasm
- Composed of
  - Smooth muscle
  - Collagen
  - Extracellular matrix
  - Fibrous tissue

**Uterine Leiomyoma**

- Majority asymptomatic
- Symptoms
  - Abnormal uterine bleeding
  - Pain and pressure
  - Infertility
- Hormonally responsive
  - Estrogen stimulates
    - Size with pregnancy
  - Progesterone inhibits
    - Size after menopause

**Uterine Leiomyoma**

- Treatments
  - Hysterectomy
  - Myomectomy
  - Medical therapy
  - Uterine artery embolization
  - Focused ultrasound

**Uterine Leiomyoma – US Findings**

- Discrete solid mass
  - Single or multiple
  - Vascularity
    - Hypervascular, hypoechoic, inhomogeneous
  - Sound attenuation
  - Contrast-defining
  - Can distort the endometrial canal
**Uterine Leiomyoma – US Findings**

- Discrete solid mass
  - Single or multiple
- Variable echogenicity
  - Hypoechoic, hyperechoic, isoechoic
- Sound-attenuating
- Contour-deforming
- Can distort the endometrial canal

**Atypical Uterine Fibroids**

- Necrosis
- Cystic degeneration
- Calcification
- Fatty degeneration
- Infection
- Sarcomatous degeneration
**Atypical Uterine Fibroids**

If large leiomyoma is located near the cervix, vaginal delivery may be difficult or impossible.

**Ovarian Carcinoma Metastases to Uterus**

**Calcified Uterine Fibroids**

**Uterine Fibroids**

**Leiomyoma Locations**

- Submucosal
- Subserosal
- Intramural - 95%
- Pedunculated
- Cervix - 3%
- Broad ligament
Submucosal Fibroids

- Incompletely surrounded by endometrium
- Acoustic shadowing
- Echogenic endometrium
  - secretory phase

Submucosal Fibroids

Diffuse Blood Flow

Submucosal or Intramural Fibroids

- may effect fertility by obstructing the movement of sperm or inhibiting normal implantation

Submucosal Fibroids

- Associated with reproductive dysfunction including:
  - Recurrent miscarriages
  - Premature labor
  - Fetal malpresentations
  - Complications of labor
**Pedunculated Submucosal Fibroid**

- Hypoechoic mass that is completely endoluminal with a narrow base of attachment
- Endometrium covering the fibroid is thickened & irregular
  - Chronic edema or inflammation related to irritation from the mass

**Intramural Leiomyoma**

may distort the endometrial canal

**Intramural Fibroids**

may displace the endometrial canal

**Subserosal Fibroids**

Will distort the uterine contour and may be difficult to distinguish from adnexal masses when pedunculated

**Diagnostic Challenge**

“probe” with the probe → moves with uterus
**Diagnostic Challenge**

“probe” with the probe → moves with uterus
Color → blood supply from uterus
Identify separate ovary

**Uterine Fibroids**

- As cause of acute pelvic pain:
  - Infarction (usually associated with pregnancy)
    - out grow blood supply → resulting in ischemia
    - no longer support of blood supply then the vessels involute quickly
  - Torsion

**RLQ Pain Post Partum**
Lipoleiomyoma

- Rare, benign tumor of myometrium that contains fat
- Asymptomatic
- Highly echogenic, solid myometrial mass that attenuates sound (diagnostic)
- Variable mixtures of fat, smooth muscle, fibrous tissue
- CT, MRI to confirm fat
**Lipoleiomyoma vs. Cystic Teratoma**

**Diagnostic Challenge**

**Leiomyosarcoma**
- Accounts for only 1-3% of uterine malignancies
- Believed to arise from existing leiomyomas
- Indistinguishable from leiomyoma

**Signs of malignancy:**
- Rapidly growing, degenerating myoma, esp. in postmenopausal woman
- Locally invasive or distant metastases

**Premenopausal Cyst—What is it?**

**Endometrial Canal**
- polyp
**Subendometrium**
- gestational sac
**Deep Endometrium**
- decidual cyst, ectopic or IUP
**Myometrium**
- adenomyosis
**Mid Myometrium**
- adenomyosis, fibroid, AVM
**Outer Myometrium**
- arcuate vessels
Adenomyosis

- Ectopic endometrial glands and stroma within the myometrium surrounded by hypoechoic smooth muscle hyperplasia, hypertrophy
**Adenomyosis – Clinical Presentations**

- Most common > 30 y/o multipara
- Menorrhagia - often have clots
- Pelvic pain - unexplained, throughout the cycle
- Dysmenorrhea
- Uterine tenderness - dyspareunia, tender on EV exam
  - Adnexa non-tender in adenomyosis (PID, endometriosis)

**Adenomyosis – Clinical Presentations**

- Most commonly a woman with this condition experience the symptoms like heavy, prolonged or excessive bleeding during menstruation and periods with severe pain
- Depending on the severity of disease and its levels of penetration into the uterine walls, the amount of cramps and bleeding varies

**Adenomyosis – US Findings**

- Enlarged & tender (focal) uterus
- Ill-defined heterogenous myometrium
- Asymmetric myometrial thickening - posteriorly
- Smooth serosal contour
- Thin pencil shadows emanating from myometrium - streaky sound attenuation
- No calcification

**Diagnostic Challenge**

- Uterine Contour
  - Distortion of external uterine contour
  - Globular uterine contour

**Adenomyosis – US Findings**

- Small, anechoic subendometrial cysts
  - Seen best in end secretory stage
  - Most specific US finding
**Adenomyosis – US Findings**

- Cystic areas or abnormal echotexture within the myometrium  
  - (a.k.a. “Swiss cheese” appearance)

**A Diagnostic Dilemma**

- Age 45  
- G5P3  
- Pain & tenderness  
- Menorrhagia
Pelvic Pain & Cramps
Day 19 of Cycle

Adenomyosis – US Findings
- Subendometrial echogenic linear striations extending into myometrium
  – May also cause pseudo-widening

Adenomyosis – US Findings
“Indistinct endometrial-myometrial border”

If endometrium is not visible in a patient with abnormal uterine bleeding, endometrial cancer is not excluded.

Diagnostic Challenge
**Adenomyosis – US Findings**

- Heterogeneity and assx widening of subendometrial myometrium / subendometrial halo
  - Hypoechoic
  - Poorly marginated

**Conclusion**

*Heterogenous myometrium / Enlarged uterus*

- Fibroids
  - Well defined mass
  - Various locations
  - Localized attenuation
  - Calcifications

- Adenomyosis
  - Ill defined mass
  - Asymmetric thickening
  - Streaky attenuation
  - Cysts

**Myometrial Disorders**

*Thank You*