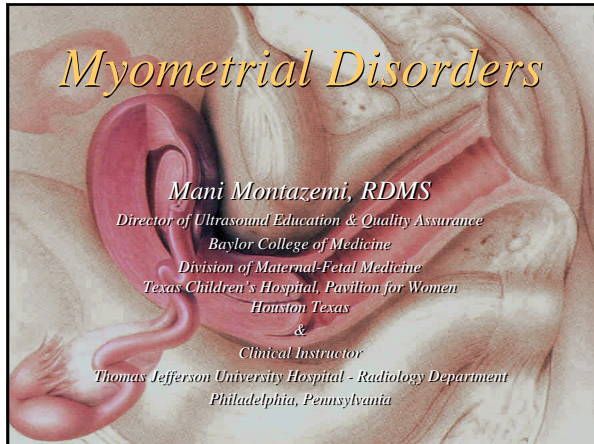
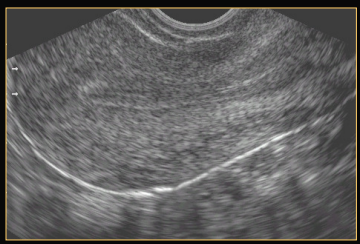


Myometrial Disorders



Mani Montazemi, RDMS
 Director of Ultrasound Education & Quality Assurance
 Baylor College of Medicine
 Division of Maternal-Fetal Medicine
 Texas Children's Hospital, Pavilion for Women
 Houston Texas
 &
 Clinical Instructor
 Thomas Jefferson University Hospital - Radiology Department
 Philadelphia, Pennsylvania

Myometrium Echogenicity



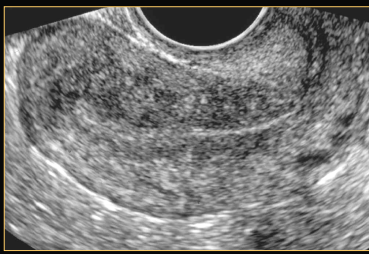
Normal myometrium has a smooth even texture throughout

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Inhomogeneous Myometrium

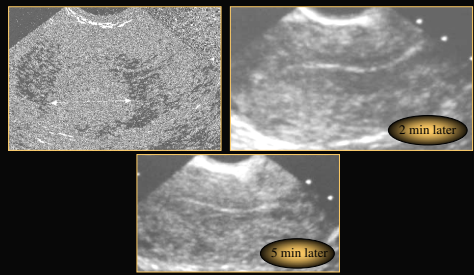
- Transient
- Real



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Myometrium Echogenicity



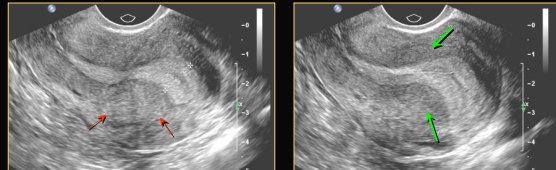
2 min later

5 min later

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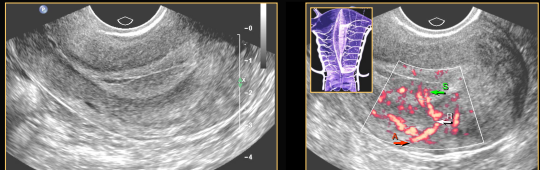
Myometrium Echogenicity



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Myometrium Echogenicity



- Arcuate artery
- Radial artery
- Spiral artery

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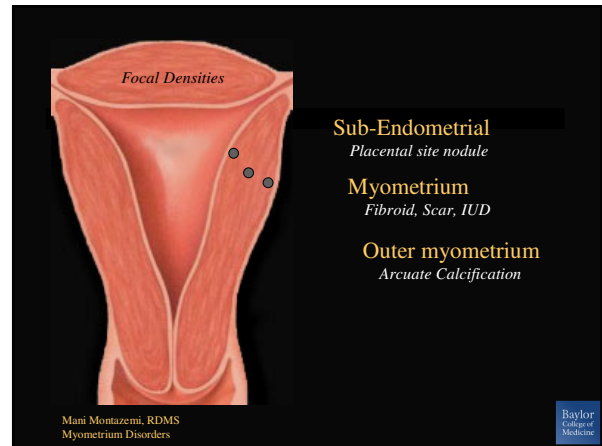
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Inhomogeneous Myometrium

- **Densities**
 - Small, focal, well defined
- **Lucencies** or holes
 - Vessels – flow
 - Cysts – no flow
- **Masses**
 - Discrete with a border – fibroid
 - Ill-defined – adenomyosis

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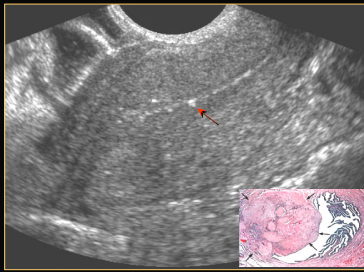
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Endo/Subendometrial Densities

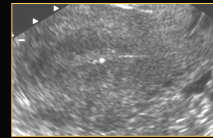
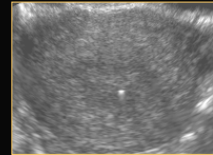


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Placental Site Nodules

- Focal echodensity at endo-myo 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

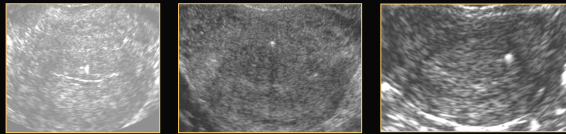


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Endo/Subendometrial Densities

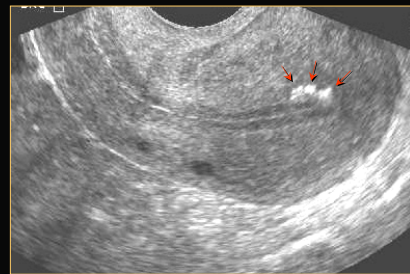
- Most are variants of normal
- Most are clinically insignificant



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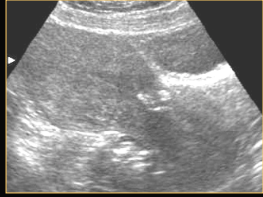
Endo/Subendometrial Densities



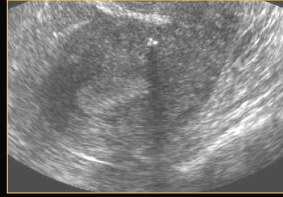
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Myometrium Densities



Transabdominal

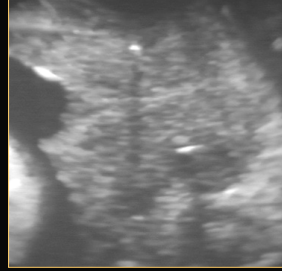


Transvaginal

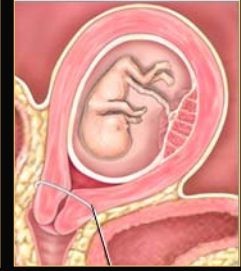
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Myometrium Densities

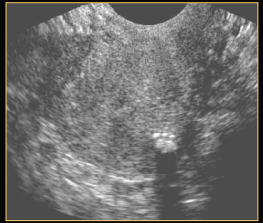


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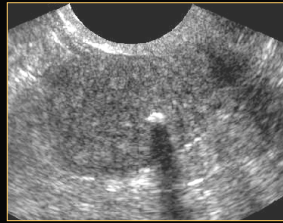


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Myometrium Densities

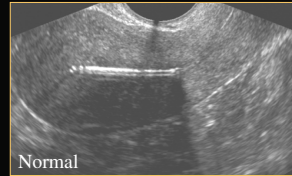


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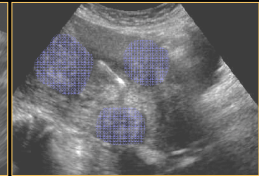
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Myometrium Densities



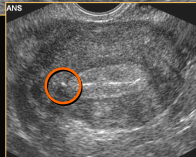
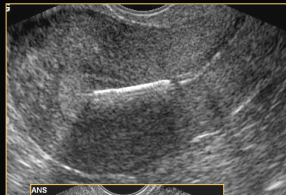
Normal

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43 y/o G0P0
intermenstrual bleed + pain

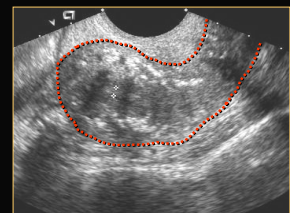


Right arm extends into the myometrium

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Outer Myometrium Arcuate Artery Calcifications

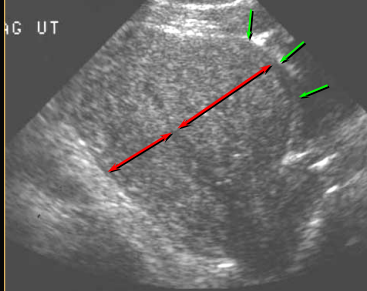
- May be seen in older women as symmetric calcified punctate structures
- Associated with
 - Diabetes
 - Hypertension



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Diagnostic Challenge



Uterine Leiomyoma – US Findings

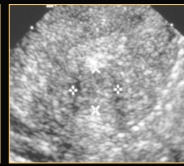
- Discrete solid mass
 - single or multiple

- Variable echogenicity
 - Hypochoic, hyperechoic, isochoic
- Sound-attenuating
- Contour-deforming
- Can distort the endometrial canal



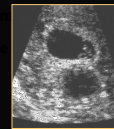
Uterine Leiomyoma – US Findings

- Discrete solid mass
 - single or multiple
- Variable echogenicity
 - Hypochoic, hyperechoic, isochoic



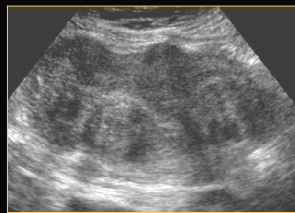
Uterine Leiomyoma – US Findings

- Discrete solid mass
 - single or multiple
- Variable echogenicity
 - Hypochoic, hyperechoic, isochoic
- Sound-attenuating



Uterine Leiomyoma – US Findings

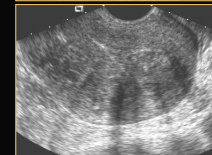
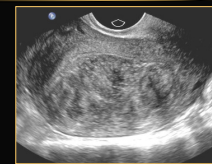
- Discrete solid mass
 - single or multiple
- Variable echogenicity
 - Hypochoic, hyperechoic, isochoic
- Sound-attenuating
- Contour-deforming



- Can distort the endometrial canal
- May undergo degenerative changes

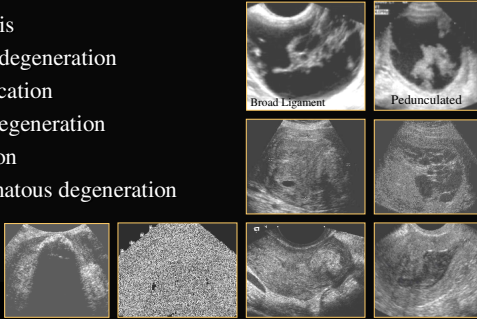
Uterine Leiomyoma – US Findings

- Discrete solid mass
 - single or multiple
- Variable echogenicity
 - Hypochoic, hyperechoic, isochoic
- Sound-attenuating
- Contour-deforming
- Can distort the endometrial canal

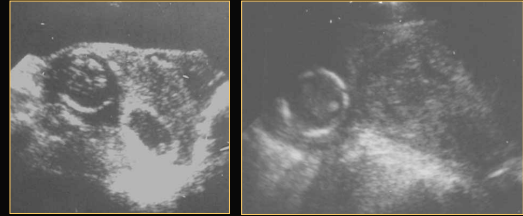


Atypical Uterine Fibroids

- Necrosis
- Cystic degeneration
- Calcification
- Fatty degeneration
- Infection
- Sarcomatous degeneration



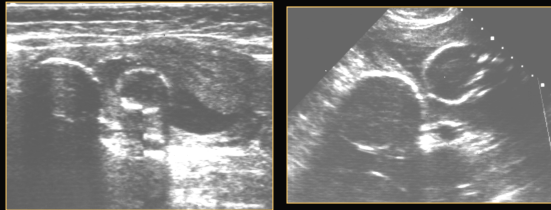
Atypical Uterine Fibroids



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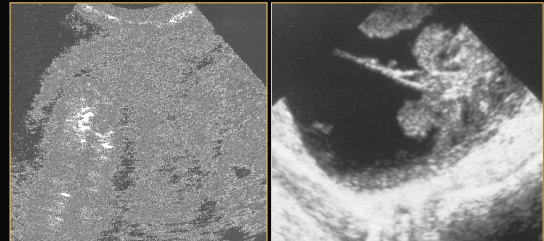
Atypical Uterine Fibroids



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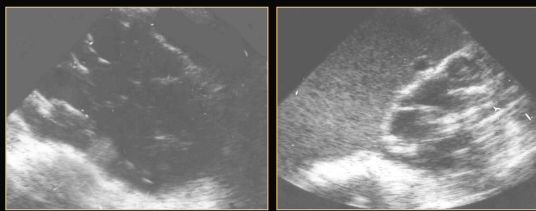
Ovarian Carcinoma Metastases to Uterus



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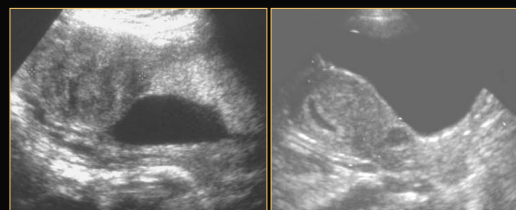
Calcified Uterine Fibroids



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Uterine Fibroids



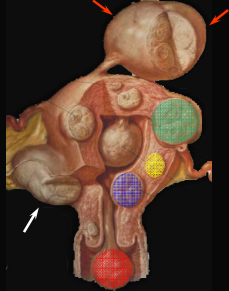
If large leiomyoma is located near the cervix, vaginal delivery may be difficult or impossible

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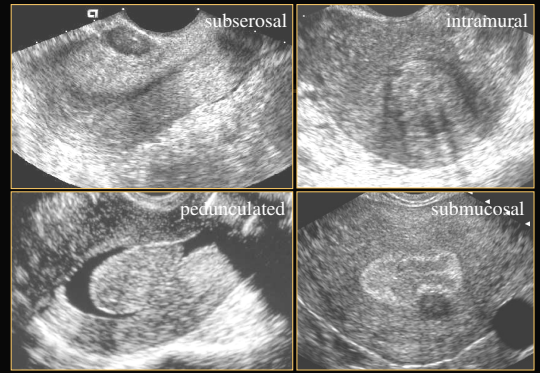
Leiomyoma Locations

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



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Submucosal Fibroids

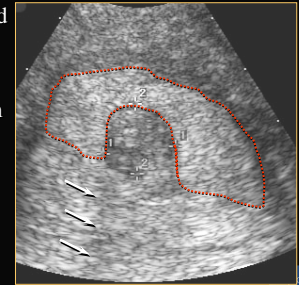


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Submucosal Fibroids

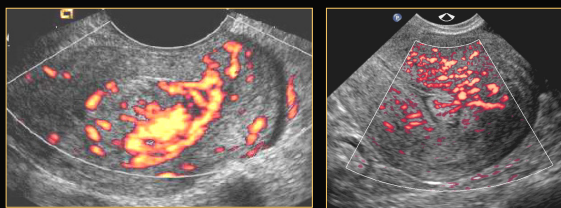
- Incompletely surrounded by endometrium
- Acoustic shadowing
- Echogenic endometrium – secretory phase



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Submucosal Fibroids



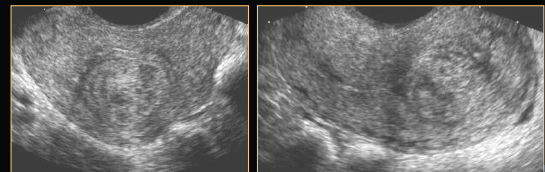
Diffuse Blood Flow

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Submucosal or Intramural Fibroids

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



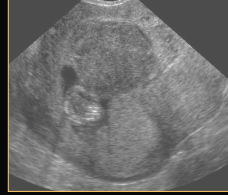
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Submucosal Fibroids

Associated with reproductive dysfunction including:

- Recurrent miscarriages
- Premature labor
- Fetal malpresentations
- Complications of labor

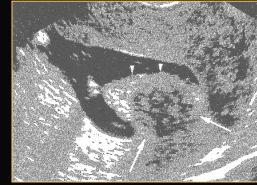


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Pedunculated Submucosal Fibroid

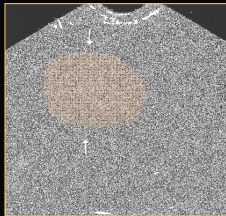
- Hypoechoic mass that is completely endoluminal with a narrow base of attachment
- Endometrium covering the fibroid is thickened & irregular
 - Chronic edema or inflammation related to irritation from the mass



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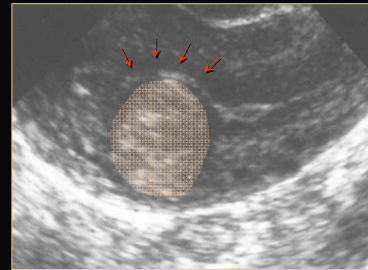
Intramural Leiomyoma may distort the endometrial canal



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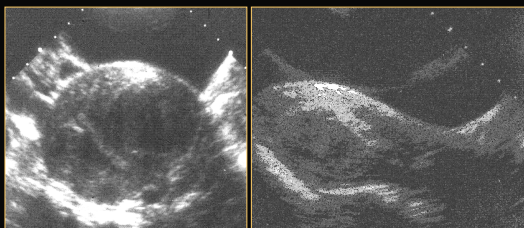
Intramural Fibroids may displace the endometrial canal



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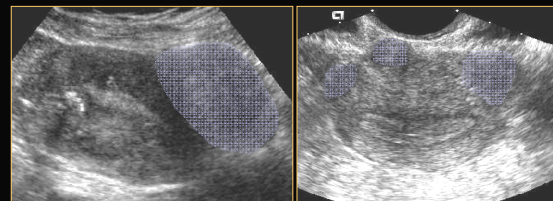
Intramural Fibroids may displace the endometrial canal



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Subserosal Fibroids

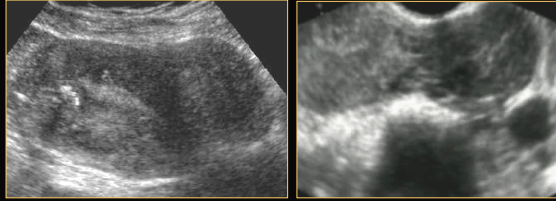


Will distort the uterine contour and may be difficult to distinguish from adnexal masses when pedunculated

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Diagnostic Challenge

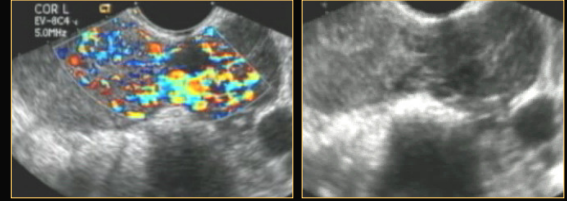


"probe" with the probe → moves with uterus

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Diagnostic Challenge

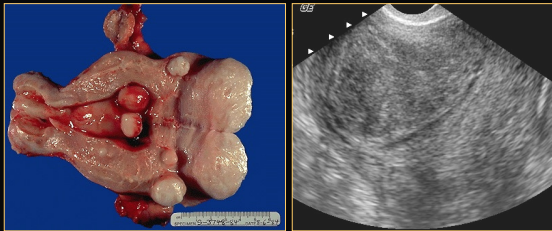


"probe" with the probe → moves with uterus
Color → blood supply from uterus
Identify separate ovary

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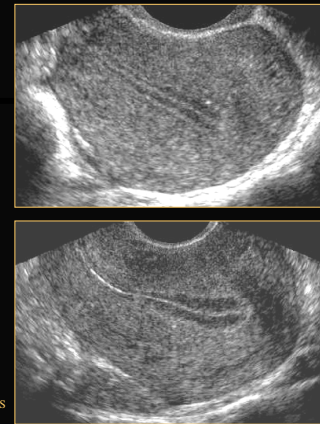
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Uterine Fibroids



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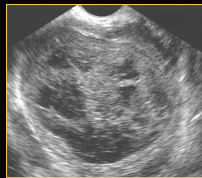


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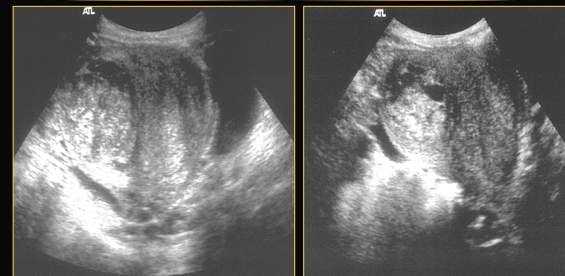
- As cause of acute pelvic pain:
 - Infarction (usually associated with pregnancy)
 - out grow blood supply – resulting in ischemia
 - no longer support of blood supply then the vessels involute quickly
 - Torsion



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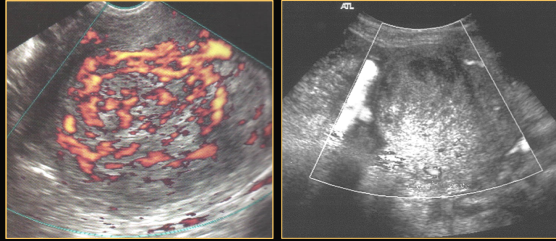
RLQ Pain Post Partum



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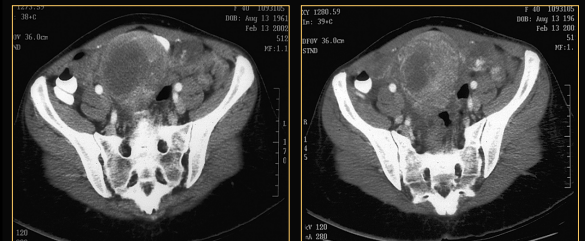
RLQ Pain Post Partum



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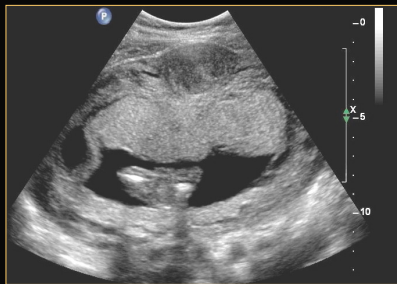
Acute Hemorrhagic Infarction of Fibroid



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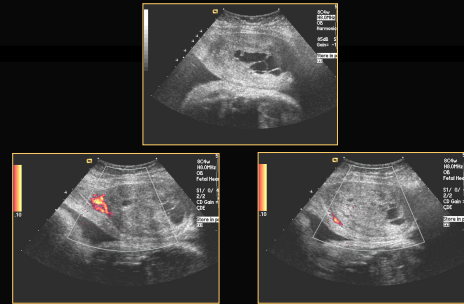
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Uterine Fibroids



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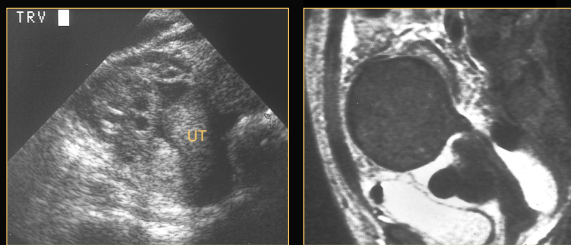
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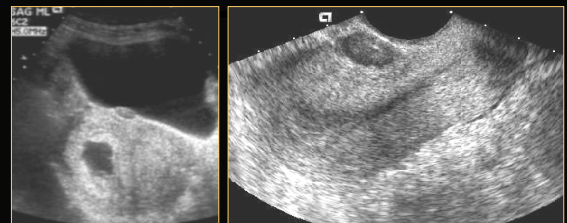
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Pedunculated Fibroids

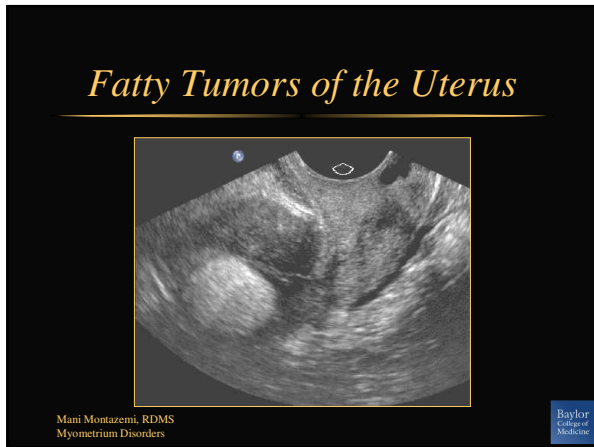
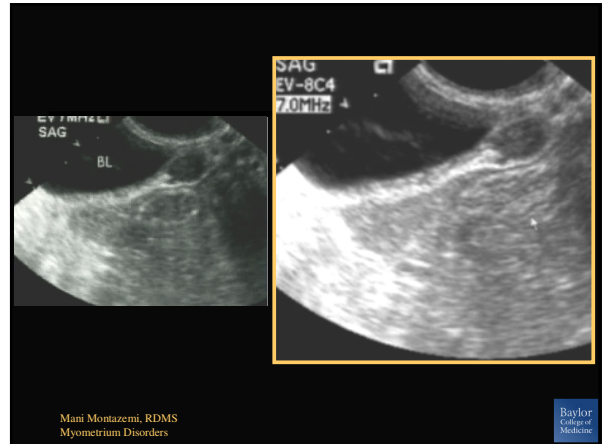
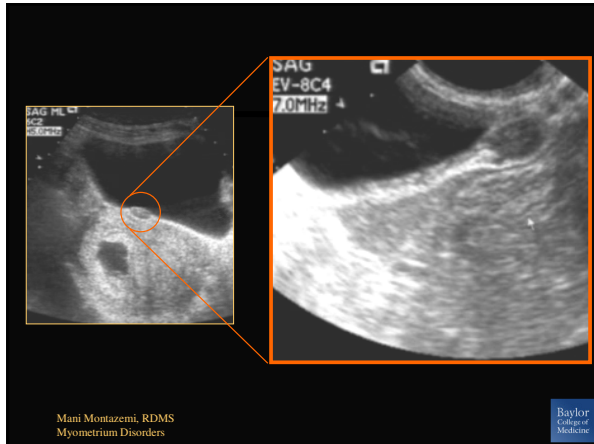


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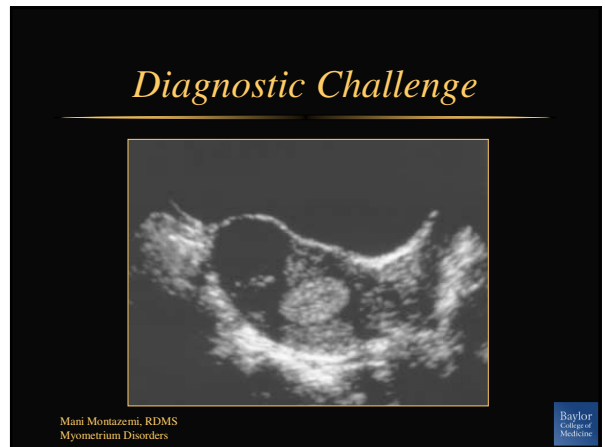
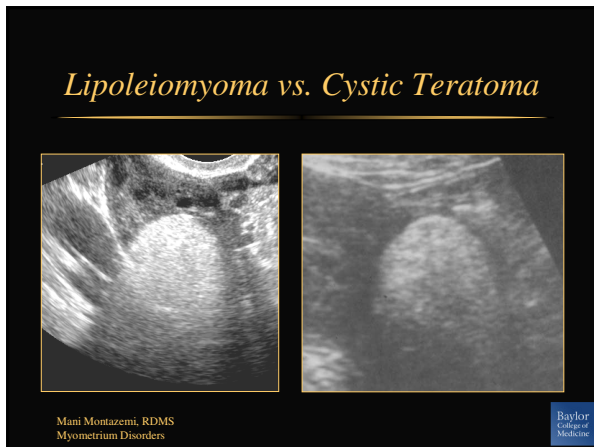


Lipoleiomyoma

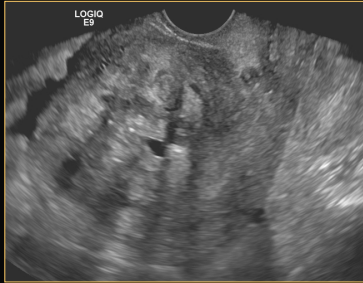
- Rare, benign tumor of myometrium that contains fat
- Asymptomatic
- Highly echogenic, solid myometrial mass that attenuates sound (diagnostic)
- Variable mixtures of fat, smooth muscle, fibrous tissue
- CT, MRI to confirm fat

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Diagnostic Challenge

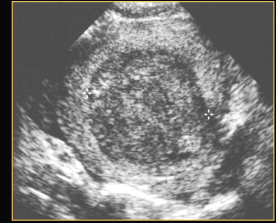


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Leiomyosarcoma

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

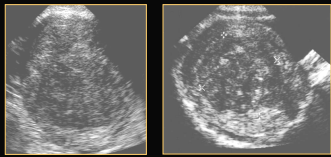


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Leiomyosarcoma

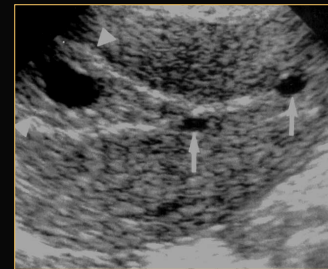
- Signs of malignancy:
 - Rapidly growing, degenerating myoma, esp. in postmenopausal woman
 - Locally invasive or distant metastases



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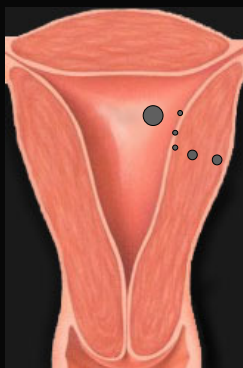
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Premenopausal Cyst-What is it?



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Endometrial Canal
polyp

Subendometrium
gestational sac

Deep Endometrium
decidual cyst, ectopic or IUP

Myometrium
adenomyosis

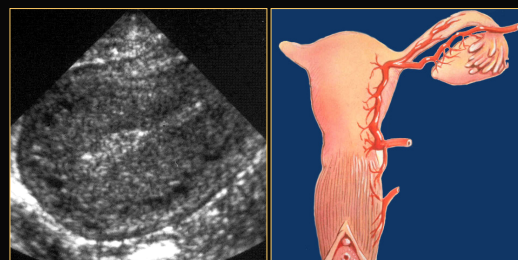
Mid Myometrium
adenomyosis, fibroid, AVM

Outer Myometrium
arcuate vessels

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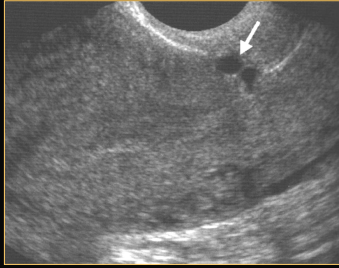
Outer Myometrium



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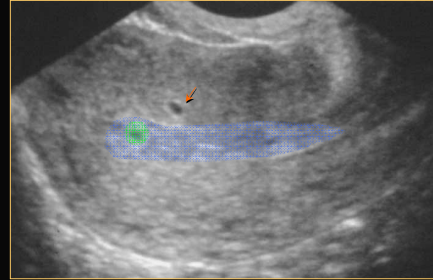
Uterine Cysts



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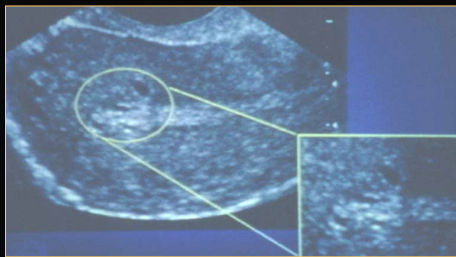
Diagnostic Challenge



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Uterine Cysts — beta now 540 ? ectopic

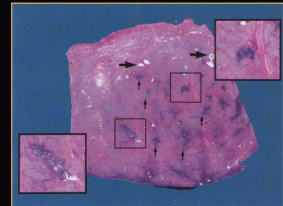


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Adenomyosis

- Ectopic endometrial glands and stroma within the myometrium surrounded by hypoechoic smooth muscle hyperplasia, hypertrophy



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Adenomyosis



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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)

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Adenomyosis – Clinical Presentations

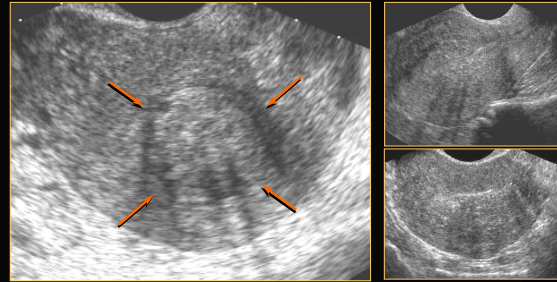
- Most commonly a woman with this condition experience the symptoms like heavy, prolonged or excessive bleeding during menstruation and periods with severe pain
- Depending on the severity of disease and its levels of penetration into the uterine walls, the amount of cramps and bleeding varies



By only conducting the biopsy of the uterine walls, this condition can be diagnosed with certainty

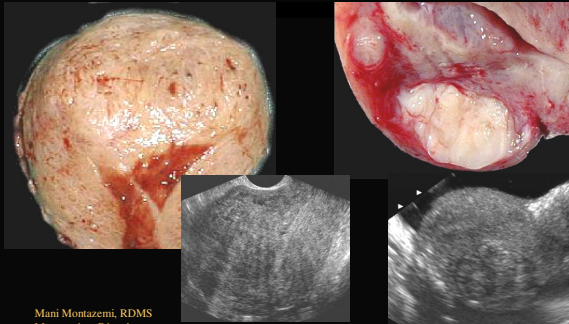
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Adenomyosis – US Findings



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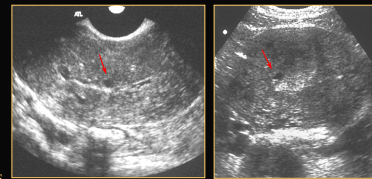
Diagnostic Challenge



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Adenomyosis – US Findings

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

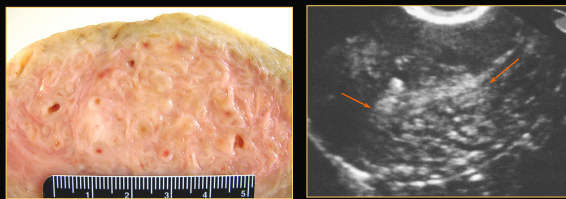


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Adenomyosis – US Findings

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




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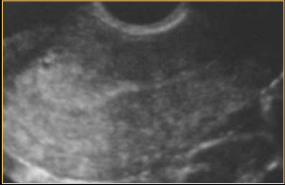
A Diagnostic Dilemma

- Age 45
- G⁵P³
- Pain & tenderness
- Menorrhagia

Myometrial Cyst



Day 20

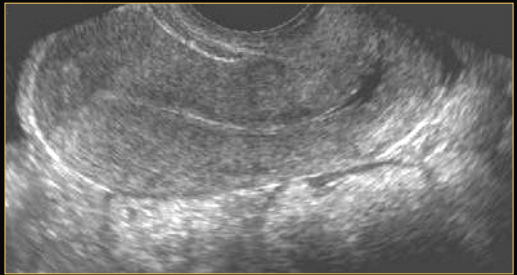


Day 25

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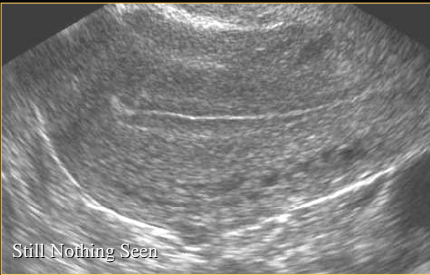
Pelvic Pain & Cramps *Day 1 of Cycle*



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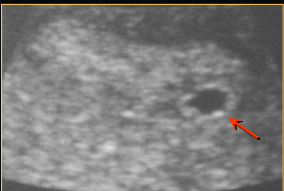
Pelvic Pain & Cramps *Day 12 of Cycle*



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Pelvic Pain & Cramps *Day 19 of Cycle*

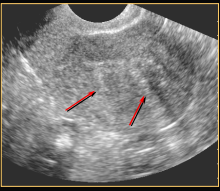
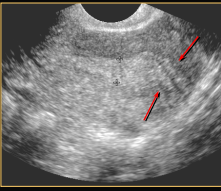



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Adenomyosis – US Findings

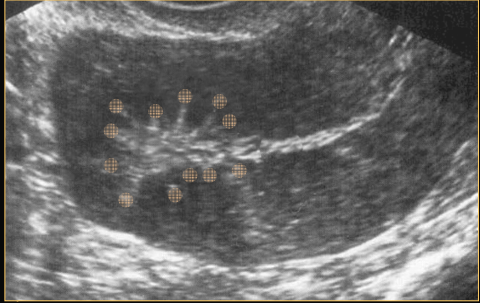
- Subendometrial echogenic linear striations extending into myometrium
 - May also cause pseudo-widening

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Adenomyosis – US Findings

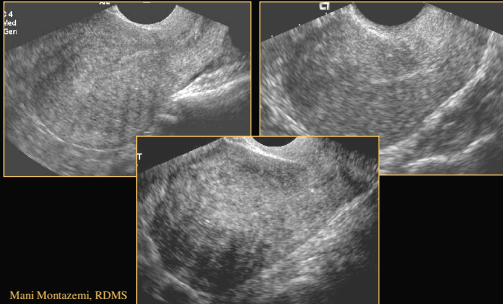


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Adenomyosis – US Findings

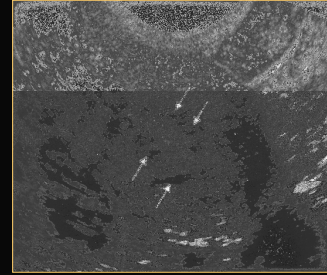
Indistinct endometrial-myometrial border



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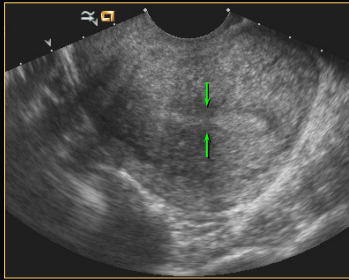
Poorly visualized endometrial echo at transvaginal US
adenomyosis in a 66-year-old asymptomatic woman who had
undergone tamoxifen therapy for 45 months



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Diagnostic Challenge

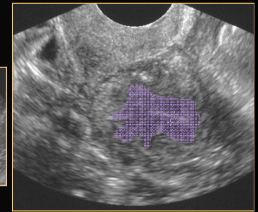
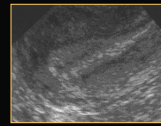


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Adenomyosis – US Findings

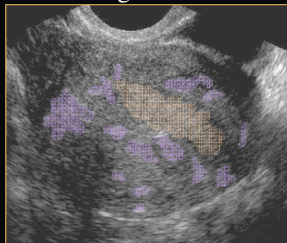
- Heterogeneity and asx widening of subendometrial myometrium / subendometrial halo
 - Hypochoic
 - Poorly marginated



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Adenomyosis – US Findings

- Echogenic islands of ectopic tissue



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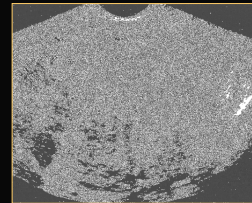
52 Y/O with Menorrhagia

Adenomyosis – US Findings

- Striated, linear shadowing w/o definite mass
- Streaky sound attenuation



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Fibroids

- Well defined mass
- Various locations
- Localized attenuation
- Calcifications
- Nulliparous
- Rx: medical & other

Adenomyosis

- Ill defined mass
- Asymmetric thickening
- Streaky attenuation
- Cysts
- Multiparous
- Rx: Hysterectomy

Ultrasound Evaluation of the Myometrium

Thank You