Endometrial Imaging

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Nothing to disclose
Thickened Endometrium

- Patients with abnormal uterine bleeding

Thickened Endometrium

- Patients with abnormal uterine bleeding
  - Post menopausal
  - 5mm and over

Thickened Endometrium

- Patients with abnormal uterine bleeding
  - Post menopausal
    - 5mm and over
    - Detects 96% of endometrial cancer

**Thickened Endometrium**

- Patients with abnormal uterine bleeding
  - Post menopausal
    - 5mm and over
    - Detects 96% of endometrial cancer
  - Hormone replacement does not change cutoff value

Thickened Endometrium

- Patients with abnormal uterine bleeding
  - Post menopausal
    - 5mm and over
  - Pre menopausal
    - 15mm and over

Thickened Endometrium

- Patients with abnormal uterine bleeding
  - Post menopausal
    - 5mm and over
  - Pre menopausal
    - 15mm and over
    - Decision to biopsy is based on symptoms and clinical presentation

ACOG/SGO Practice Bulletin 149 April 2015
Thickened Endometrium

- Patients with abnormal uterine bleeding
  - Post menopausal
    - 5mm and over
  - Pre menopausal
    - 15mm and over
- Patients without abnormal uterine bleeding

ACOG/SGO Practice Bulletin 149 April 2015
Thickened Endometrium

- Patients with abnormal uterine bleeding
  - Post menopausal
    - 5mm and over
  - Pre menopausal
    - 15mm and over
- Patients without abnormal uterine bleeding
  - ????
What to do about it?

- Differential Diagnosis of Thickened Endometrium
  - Endometrial Hyperplasia
  - Endometrial Polyp
  - Endometrial Carcinoma
What to do about it?

- Differential Diagnosis of Thickened Endometrium
  - Endometrial Hyperplasia
  - Endometrial Polyp
  - Endometrial Carcinoma

- Biopsy is required
WHO Classification of Uterine Tumors

- **Epithelial**
  - Precursors
    - Endometrial hyperplasia without atypia
    - Endometroid intraepithelial neoplasia
  - Endometrial carcinoma
  - Tumor like lesions
    - Polyp
    - Metaplasias
    - Arias-Stella reaction
    - Lymphoma-like lesion

- **Mesenchymal**
  - Endometrial stromal and related tumors
    - Leiomyosarcoma
    - Smooth muscle tumor of unknown malignant potential
  - Leiomyoma
  - Miscellaneous

- **Mixed epithelial and mesenchymal**
  - Carcinosarcoma
  - Adenosarcoma
  - Adenomyoma
  - Adenofibroma
  - Atypical polypoid adenomyoma

- **Miscellaneous**
  - Adenomatoid tumors
  - Neuroectodermal tumors
  - Germ cell tumors
  - Lymphoid and myeloid tumors
  - Secondary tumors

Kurman RJ, et al. WHO Classification of Tumours of Female Reproductive Organs. 2014.
WHO Classification of Uterine Tumors

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WHO Classification of Uterine Tumors

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  - **Precursors**
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    - *Endometroid intraepithelial neoplasia*
  - *Endometrial carcinoma*
  - *Tumor like lesions*
    - *Polyp*
    - *Metaplasias*
    - *Arias-Stella reaction*
    - *Lymphoma-like lesion*
- **Mesenchymal**
  - *Endometrial stromal and related tumors*
  - *Leiomyosarcoma*
  - *Smooth muscle tumor of unknown malignant potential*
  - *Leiomyoma*
  - *Miscellaneous*
- **Mixed epithelial and mesenchymal**
  - *Carcinosarcoma*
  - *Adenosarcoma*
  - *Adenomyoma*
  - *Adenofibroma*
  - *Atypical polypoid adenomyoma*
- **Miscellaneous**
  - *Adenomatoid tumors*
  - *Neuroectodermal tumors*
  - *Germ cell tumors*
  - *Lymphoid and myeloid tumors*
  - *Secondary tumors*

Kurman RJ, et al. WHO Classification of Tumours of Female Reproductive Organs. 2014.
Endometrial Hyperplasia

- 2 Pathologic classification systems
Endometrial Hyperplasia

- 2 Pathologic classification systems
  - World Health Organization
    - Hyperplasia without atypia, atypical hyperplasia

Kurman RJ. WHO Classification of Tumours of the Female Reproductive Organs. 2014.
Risk stratification

- Hyperplasia without atypia
  - Less than 2% risk of endometrial carcinoma
- Atypical hyperplasia
  - 30% risk of endometrial carcinoma

Kurman RJ. WHO Classification of Tumours of the Female Reproductive Organs. 2014.
Endometrial Hyperplasia

- 2 Pathologic classification systems
  - World Health Organization
    - Hyperplasia without atypia, atypical hyperplasia
  - International Endometrial Collaborative Group
    - Benign, endometrial intraepithelial neoplasia
International Endometrial Collaborative Group

- Risk stratification
  - Benign
    - 1% risk of endometrial carcinoma
  - Endometrial intraepithelial neoplasia (EIN)
    - 25-45% risk of endometrial carcinoma

International Endometrial Collaborative Group

- Risk stratification
  - Benign
    - 1% risk of endometrial carcinoma
    - Endometrial intraepithelial neoplasia (EIN)
      - 25-45% risk of endometrial carcinoma
  - Risk assessment is more accurate
  - Better inter-observer reproducibility

Endometrial Hyperplasia

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Endometrial Hyperplasia

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    - Benign, endometrial intraepithelial neoplasia

Hyperplasia without atypia = Benign
Endometrial Hyperplasia

- 2 Pathologic classification systems
  - World Health Organization
    - Hyperplasia without atypia, atypical hyperplasia
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    - Benign, endometrial intraepithelial neoplasia

Atypical hyperplasia = Endometrial intraepithelial neoplasia
Endometrial Hyperplasia

- 2 pathologic entities
  - Benign or Hyperplasia without atypia
Endometrial Hyperplasia

- 2 pathologic entities
  - Benign or Hyperplasia without atypia
    - Low risk of endometrial carcinoma
Benign Hyperplasia Etiology

- Estrogen excess despite relative progesterone deficiency
Benign Hyperplasia Etiology

- Estrogen excess despite relative progesterone deficiency
  - Chronic anovulatory states
  - Unopposed exogenous estrogen use
- Tamoxifen
- Obesity
- Estrogen secreting tumors
Benign Hyperplasia Pathology

- Excessive proliferation of endometrial glands with an increased glands to stroma ratio, but without nuclear atypia
Benign Hyperplasia Pathology

- Excessive proliferation of endometrial glands with an increased glands to stroma ratio, but without nuclear atypia

Normal

Benign Hyperplasia
Benign Hyperplasia Pathology

- Excessive proliferation of endometrial glands with an increased glands to stroma ratio, but without nuclear atypia

Normal

Benign Hyperplasia
Endometrial Hyperplasia

- 2 pathologic entities
  - Benign or Hyperplasia without atypia
    - Low risk of endometrial carcinoma
  - Endometroid intraepithelial neoplasia or atypical hyperplasia
Endometrial Hyperplasia

- 2 pathologic entities
  - Benign or Hyperplasia without atypia
    - Low risk of endometrial carcinoma
  - Endometroid intraepithelial neoplasia or atypical hyperplasia
    - High risk of endometrial carcinoma
Endometroid Intraepithelial Hyperplasia

- Precancerous lesion
Endometroid Intraepithelial Hyperplasia

- Precancerous lesion
- 30-50% have a coexisting endometrial carcinoma
  - Treated with D&C or hysterectomy
Endometroid Intraepithelial Hyperplasia

- Precancerous lesion
- 30-50% have a coexisting endometrial carcinoma
  - Treated with D&C or hysterectomy
- 30% risk of endometrial carcinoma with no treatment
Endometroid Intraepithelial Hyperplasia Etiology

- Molecular (somatic) abnormalities
Endometroid Intraepithelial Hyperplasia Etiology

- Molecular (somatic) abnormalities
  - Inactivation *PTEN* tumor suppressor gene
    - Most common
Endometroid Intraepithelial Hyperplasia Etiology

- Molecular (somatic) abnormalities
  - Inactivation *PTEN* tumor suppressor gene
  - Most common
Endometroid Intraepithelial Hyperplasia Pathology

- Cytological atypia superimposed on endometrial hyperplasia

http://www.endometrium.org/EIN%20Central/FramePages/ArchFrame.htm
Endometroid Intraepithelial Hyperplasia Pathology

- Cytological atypia superimposed on endometrial hyperplasia
Endometroid Intraepithelial Hyperplasia Pathology

- Cytological atypia superimposed on endometrial hyperplasia

[PTEN Immunohistochemistry](http://www.endometrium.org/EIN%20Central/FramePages/ArchFrame.htm)
Endometroid Intraepithelial Hyperplasia Pathology

- Cytological atypia superimposed on endometrial hyperplasia

* * *

PTEN Immunohistochemistry

http://www.endometrium.org/EIN%20Central/FramePages/ArchFrame.htm
Endometroid Intraepithelial Hyperplasia Pathology

- Cytological atypia superimposed on endometrial hyperplasia

PTEN Immunohistochemistry

http://www.endometrium.org/EIN%20Central/FramePages/ArchFrame.htm
Endometrial Hyperplasia on Ultrasound

- Thickened endometrium
  - Post menopausal: 5mm and over
  - Pre menopausal: 15mm and over
Endometrial Hyperplasia on Ultrasound

- Thickened endometrium
- +/- Cystic regions
Endometrial Hyperplasia on Ultrasound

- Patients with abnormal uterine bleeding
  - Post menopausal
    - 5mm and over
  - Pre menopausal
    - 15mm and over

Endometrial Hyperplasia on Ultrasound

Focal or diffuse endometrial thickening
Endometrial Hyperplasia on Ultrasound

Focal or diffuse endometrial thickening
Endometrial Hyperplasia on Ultrasound

Focal or diffuse endometrial thickening
Endometrial Hyperplasia on Ultrasound

Focal or diffuse endometrial thickening
Endometrial Hyperplasia on Ultrasound

Can contain cystic spaces
Endometrial Hyperplasia on Ultrasound

Can contain cystic spaces
What to do about it?

- Biopsy
What to do about it?

- Biopsy
  - Cannot be distinguished from
    - Endometrial Polyp
    - Endometrial Carcinoma
WHO Classification of Uterine Tumors

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  - Miscellaneous
  - Mixed epithelial and mesenchymal
    - Carcinosarcoma
    - Adenosarcoma
    - Adenomyoma
    - Adenofibroma
    - Atypical polypoid adenomyoma
  - Miscellaneous
    - Adenomatoid tumors
    - Neuroectodermal tumors
    - Germ cell tumors
  - Lymphoid and myeloid tumors
  - Secondary tumors

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Endometrial Polyp Pathology

- Localized overgrowth of endometrial glands and stroma that forms a sessile or pedunculated projection from the surface of the endometrium.

http://library.med.utah.edu/WebPath
Endometrial Polyp Pathology

- **Localized overgrowth of endometrial glands and stroma** that forms a sessile or pedunculated projection from the surface of the endometrium.

[Image: http://library.med.utah.edu/WebPath]
Endometrial Polyp Pathology

- Localized overgrowth of endometrial glands and stroma that forms a sessile or pedunculated projection from the surface of the endometrium.
Endometrial Polyp Pathology

- Localized overgrowth of endometrial glands and stroma that forms a sessile or pedunculated projection from the surface of the endometrium.
  - Endometrial hyperplasia with a surface epithelium or endometrial covering

[Image: endometrial polyp with measurement scale]

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  - Endometrial hyperplasia with a surface epithelium or endometrial covering
Endometrial Polyp Pathology

Endometrial Polyp on Ultrasound

- Hyperechoic lesion
Endometrial Polyp on Ultrasound

Hyperechoic lesion
Endometrial Polyp on Ultrasound

Hyperechoic lesion
Endometrial Polyp on Ultrasound

Hyperechoic lesion
Endometrial Polyp on Ultrasound

Hyperechoic lesion
Endometrial Polyp on Ultrasound

- Hyperechoic lesion
- +/- Cystic regions
Endometrial Polyp on Ultrasound
Can contain cystic spaces
Endometrial Polyp on Ultrasound
Can contain cystic spaces
Endometrial Polyp on Ultrasound

Can contain cystic spaces
Endometrial Polyp on Ultrasound

Can contain cystic spaces
Endometrial Polyp on Ultrasound

- Hyperechoic lesion
- +/- Cystic regions
- Rounded or sessile
Endometrial Polyp on Ultrasound

Rounded or sessile
Endometrial Polyp on Ultrasound

Rounded or sessile
Endometrial Polyp on Ultrasound

Rounded or sessile
Endometrial Polyp on Ultrasound

Rounded or sessile
Endometrial Polyp on Ultrasound

Rounded or sessile
Endometrial Polyp on Ultrasound

Rounded or sessile
Endometrial Polyp on Ultrasound

- Hyperechoic lesion
- +/- Cystic regions
- Rounded or sessile
- Feeding artery on color Doppler
Endometrial Polyp on Ultrasound

Feeding Artery
Endometrial Polyp on Ultrasound

Feeding Artery
Endometrial Polyp on Ultrasound

Feeding Artery
Endometrial Polyp on Ultrasound

Feeding Artery
What to do about it?

- No further imaging needed unless:
  - Indeterminate
What to do about it?

- No further imaging needed unless:
  - Indeterminate
- If further imaging is needed:
  - Sono-hysteroscopy
What to do about it?

- No further imaging needed unless:
  - Indeterminate
- If further imaging is needed:
  - Sono-hysterography
  - MRI
Endometrial Polyp on MRI

- Iso to low T2 signal compared to endometrium
Endometrial Polyp on MRI

- Iso to low T2 signal compared to endometrium
Endometrial Polyp on MRI

- Iso to low T2 signal compared to endometrium
- Enhancement

Sagittal T1 Fat Sat Post
Endometrial Polyp on MRI

- Iso to low T2 signal compared to endometrium
- Enhancement

Sagittal T1 Fat Sat Post
Endometrial Polyp on MRI

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Endometrial Polyp on MRI

- Iso to low T2 signal compared to endometrium
- Enhancement

Sagittal T1 Fat Sat Post
Endometrial Polyp on MRI

- Iso to low T2 signal compared to endometrium
- Enhancement
- Can contain cystic areas

Sagittal T2
Endometrial Polyp on MRI

- Iso to low T2 signal compared to endometrium
- Enhancement
- Can contain cystic areas

Sagittal T2
## Endometrial Polyp on Imaging

<table>
<thead>
<tr>
<th>Ultrasound</th>
<th>MRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Hyperechoic lesion</td>
<td>-Iso to low T2 signal</td>
</tr>
<tr>
<td>- +/- Cystic regions</td>
<td>compared to endometrium</td>
</tr>
<tr>
<td>- Rounded or sessile</td>
<td>- Enhancement</td>
</tr>
<tr>
<td>- Feeding artery on color</td>
<td>- Can contain cystic areas</td>
</tr>
<tr>
<td>Doppler</td>
<td></td>
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</tbody>
</table>
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- **Epithelial**
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  - Endometrial stromal and related tumors
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  - Germ cell tumors
  - Lymphoid and myeloid tumors
  - Secondary tumors

Kurman RJ, et al. WHO Classification of Tumours of Female Reproductive Organs. 2014.
Endometrial Carcinoma

- Most common gynecologic malignancy in USA
Endometrial Carcinoma

- Most common gynecologic malignancy in USA
- 90% present with postmenopausal bleeding
Endometrial Carcinoma

- Most common gynecologic malignancy in USA
- 90% present with postmenopausal bleeding
- 10% of women with postmenopausal bleeding have endometrial cancer
WHO Classification of Uterine Tumors

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WHO Classification of Endometrial Carcinoma

- Endometrial carcinoma
  - Endometroid carcinoma
  - Mucinous carcinoma
  - Serous endometrial intraepithelial carcinoma
  - Serous carcinoma
  - Clear cell carcinoma
  - Neuroendocrine tumors
  - Mixed cell adenocarcinoma
  - Undifferentiated carcinoma
  - Dedifferentiated carcinoma

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Endometrial Carcinoma
Pathology

- Two types
  - Type 1
    - Arise from unopposed estrogen stimulation
  - Type 2
    - Arise from pathologic mutations (p53, etc.)
Endometrial Carcinoma Pathology

- **Type 1**
  - Most common (80-90%)
  - Arise from unopposed estrogen stimulation
    - Chronic anovulatory states
    - Unopposed exogenous estrogen use
    - Tamoxifen
    - Obesity
    - Estrogen secreting tumors
Endometrial Carcinoma Pathology

- Type 2
  - Arise from pathologic mutations (p53, etc.)
    - p53 mutation in over 50%
  - Not linked to hormonally driven pathogenesis
  - Associated with endometrial atrophy
Endometrial Carcinoma Pathology

- Type 2
  - Arise from pathologic mutations (p53, etc.)
    - p53 mutation in over 50%
  - Not linked to hormonally driven pathogenesis
  - Associated with endometrial atrophy
  - Poorer prognosis than type 1
Endometrial Carcinoma Pathology

- Type 2
  - Arise from pathologic mutations (p53, etc.)
    - p53 mutation in over 50%
  - Not linked to hormonally driven pathogenesis
  - Associated with endometrial atrophy
  - Poorer prognosis than type 1
    - 10-20% of cases
    - 40% of endometrial cancer deaths
Endometrial Carcinoma Pathology

- Moving toward a molecular based categorization

Endometrial Carcinoma Pathology

- Moving toward a molecular based categorization
- Proactive Molecular Risk Classifier for Endometrial Cancer
  - Mismatch repair deficient (MMR-D)
  - P53 wild type
  - P53 null/missense mutation
    - Worst prognosis
  - \textit{POLE} mutation
    - Most favorable prognosis

Endometrial Carcinoma Pathology

- Stromal invasion
- Nuclear atypia
- Abnormal gland formation

http://library.med.utah.edu/WebPath
Endometrial Carcinoma Pathology

- Stromal invasion
- Nuclear atypia
- Abnormal gland formation

http://library.med.utah.edu/WebPath
Endometrial Carcinoma
Pathology

- Abnormal gland formation

http://www.diagnosticpathology.org/content/4/1/10/figure/F7?highres=y
Endometrial Carcinoma

Pathology

Endometrial Carcinoma

Benign Hyperplasia

http://www.diagnosticpathology.org/content/4/1/10/figure/F7?highres=y
Endometrial Carcinoma Pathology

- Abnormal gland formation
- Decreasing gland formation with increasing FIGO grade

FIGO Grade 2

http://www.diagnosticpathology.org/content/4/1/10/figure/F7?highres=y
Endometrial Carcinoma Pathology

- Abnormal gland formation
- Decreasing gland formation with increasing FIGO grade

FIGO Grade 3
Endometrial Carcinoma Pathology

FIGO Grade 2

FIGO Grade 3
Ultrasound Appearance of Endometrial Carcinoma

- Thickened endometrial double layer thickness
  - Post menopausal: 5mm and over
  - Pre menopausal: 15mm and over
Endometrial Carcinoma

- Patients with abnormal uterine bleeding
  - Post menopausal
    - 5mm and over
  - Pre menopausal
    - 15mm and over

Ultrasound Appearance of Endometrial Carcinoma

- Thickened endometrial double layer thickness
- Irregular endometrial-myometrial interface
Endometrial Carcinoma

Irregular endometrial-myometrial interface
Endometrial Carcinoma

Irregular endometrial-myometrial interface
Ultrasound Appearance of Endometrial Carcinoma

- Thickened endometrial double layer thickness
- Irregular endometrial-myometrial interface
- Irregular vascularity
Endometrial Carcinoma

Irregular vascularity
Endometrial Carcinoma

Irregular vascularity
Endometrial Carcinoma

Irregular vascularity
Endometrial Carcinoma

Irregular vascularity
Ultrasound Appearance of Endometrial Carcinoma

- Thickened endometrial double layer thickness
- Irregular endometrial-myometrial interface
- Irregular vascularity
- Hematometra
Endometrial Carcinoma

Hematometra
Endometrial Carcinoma

Hematometra
Endometrial Carcinoma

Hematometra
Endometrial Carcinoma
Hematometra
Endometrial Carcinoma

Hematometra
Endometrial Carcinoma

Hematometra
Ultrasound Appearance of Endometrial Carcinoma

- Thickened endometrial double layer thickness
- Irregular endometrial-myometrial interface
- Irregular vascularity
- Hematometra
- Myometrial invasion
  - Only specific finding
Endometrial Carcinoma

Myometrial invasion

Only specific finding
Endometrial Carcinoma

Myometrial invasion
Only specific finding
Endometrial Carcinoma

Myometrial invasion

Only specific finding
Endometrial Cancer

Myometrial invasion

Only specific finding
Endometrial Cancer

Myometrial invasion
Only specific finding
Endometrial Cancer

Myometrial invasion
Only specific finding
Endometrial Cancer

Myometrial invasion
Only specific finding
Endometrial Cancer

Myometrial invasion
Only specific finding
Endometrial Cancer

Myometrial invasion
Only specific finding
What to do about it?

- Endometrial Biopsy
What to do about it?

- Endometrial Biopsy
- Staging
Endometrial Cancer Staging

- Surgical and pathologic staging
Endometrial Cancer Staging

- Surgical and pathologic staging
- Imaging for:
  - Suspected or gross cervical involvement
  - Suspected extra-uterine disease
Endometrial Cancer Staging

- Stage 1
  - A: Tumor confined to uterus, no or less than 50% myometrial invasion
  - B: Tumor confined to uterus, 50% or over myometrial invasion
- Stage 2
  - Cervical stromal invasion, not beyond the uterus
- Stage 3
  - A: Tumor involves serosa and/or adnexa
  - B: Vaginal and/or parametrial involvement
  - C1: Pelvic node involvement
  - C2: Para-aortic involvement
- Stage 4
  - A: Invasion of bladder and/or bowel
  - B: Distant metastases and/or inguinal adenopathy

FIGO 2010
Type 1 Endo Ca Staging and Treatment

- Total Hysterectomy (TH) and Bilateral salping-oophrectomy (BSO) followed by consideration for adjuvant treatment
  - Stage 1: Tumor confined to uterus
- Adjuvant Treatment considered before or after TH/BSO
  - Stage 2: Cervical stromal invasion, not beyond the uterus
- TH/BSO followed by adjuvant treatment
  - Stage 3A: Tumor invades serosa or adnexa
  - Stage 3C1: Pelvic node involvement
  - Stage 3C2: Para-aortic involvement
- Radiation therapy and/or chemotherapy followed by consideration for surgery
  - Stage 3B: Vaginal and/or parametrial involvement
  - Stage 4A: Invasion of bladder and/or bowel mucosa
- Palliative Therapy/Clinical Trials
  - Stage 4B: Inguinal adenopathy or Distant metastasis

Type 2 Endo Ca Staging and Treatment

- Total Hysterectomy (TH) and Bilateral salping-oophrectomy (BSO) followed by consideration for adjuvant treatment
  - Stage 1A: Tumor confined to the endometrium or invading less than 50% the myometrium
- TH/BSO followed by adjuvant treatment
  - Stage 1B: Tumor invading 50% or more of the myometrium
  - Stage 2: Cervical stromal invasion, not beyond the uterus
  - Stage 3: Tumor invading the serosa, adnexa, vagina or parametrium or pelvic or para-aortic adenopathy
  - Stage 4: Tumor invading the bladder and/or bowel or inguinal adenopathy or metastatic disease

Type 2 Endo Ca Staging and Treatment

- Total Hysterectomy (TH) and Bilateral salping-oophrectomy (BSO) followed by consideration for adjuvant treatment
  - Stage 1A: Tumor confined to the endometrium or invading less than 50% the myometrium
- TH/BSO followed by adjuvant treatment
  - Stage 1B: Tumor invading 50% or more of the myometrium
  - Stage 2: Cervical stromal invasion, not beyond the uterus
  - Stage 3: Tumor invading the serosa, adnexa, vagina or parametrium or pelvic or para-aortic adenopathy
  - Stage 4: Tumor invading the bladder and/or bowel or inguinal adenopathy or metastatic disease

- All patients go to surgery

Type 1 Endometrial Cancer Staging

- Findings that change management:
  - Cervical stromal invasion
  - Adnexal involvement
  - Adenopathy
  - Parametrial involvement
  - Vaginal involvement
  - Bladder involvement
  - Bowel involvement
  - Distant metastasis
TH/BSO

**Staging**
- 1A: Tumor confined to uterus, no or less than 50% myometrial invasion
- 1B: Tumor confined to uterus, over 50% myometrial invasion

**Radiology**
- Myometrial Invasion
  - More or less than 50%
TH/BSO

Staging
- 1A: Tumor confined to uterus, no or less than 50% myometrial invasion
- 1B: Tumor confined to uterus, over 50% myometrial invasion

Radiology
- Myometrial Invasion
  - More or less than 50%
- MRI
  - Specificity 64-100%
  - Sensitivity 69-94%

Adjuvant Treatment considered before or after TH/BSO

**Staging**
- 2: Cervical stromal invasion, not beyond the uterus

**Radiology**
- Cervical stromal invasion
Adjuvant Treatment considered before or after TH/BSO

Staging
- 2: Cervical stromal invasion, not beyond the uterus

Radiology
- Cervical stromal invasion
  - MRI
    - Accuracy 90-92%

Cervical Stromal Invasion

Disruption of the cervical zonal anatomy

Sagittal T2
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy

Sagittal T2
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy

Sagittal T2
Axial T2
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy

Sagittal T2

Axial T2
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy

Sagittal T2
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy

Sagittal T2
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy

Sagittal T2
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy

Axial T2

Sagittal T1 fat sat post
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy

Axial T2

Sagittal T1 fat sat post
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy

Axial T2

Sagittal T1 fat sat post
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy

Axial T2

Sagittal T1 fat sat post
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy

Axial T2

Axial DWI

Axial ADC
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy

Axial T2

Axial DWI

Axial ADC
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy

Axial T2
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy
Cervical Stromal Invasion
Disruption of the cervical zonal anatomy

Axial T2
TH/BSO followed by adjuvant Treatment

Staging
- 3A: Tumor invades serosa or adnexa
- 3C1: Pelvic node involvement
- 3C2: Para-aortic involvement

Radiology
- Adnexal involvement
- Adenopathy
TH/BSO followed by adjuvant Treatment

**Staging**
- 3A: Tumor invades serosa or adnexa
- 3C1: Pelvic node involvement
- 3C2: Para-aortic involvement

**Radiology**
- Adnexal involvement
- Adenopathy
  - PET/CT
    - Accuracy 89-93%
  - MRI
    - Accuracy 83-93%

Adnexal Involvement

Sagittal T2

Coronal T2
Adnexal Involvement

Sagittal T2

Coronal T2
Adnexal Involvement

Sagittal T2

Coronal T2
Pelvic Adenopathy

Axial T2
Pelvic Adenopathy

Axial T2
Para-aortic Adenopathy

Axial T2

Coronal T2
Para-aortic Adenopathy

Axial T2

Coronal T2
Radiation therapy and/or chemotherapy followed by consideration for surgery

**Staging**
- 3B: Vaginal and/or parametrial involvement
- 4A: Invasion of bladder and/or bowel mucosa

**Radiology**
- Vaginal involvement
- Parametrial involvement
- Bladder involvement
- Bowel involvement
Radiation therapy and/or chemotherapy followed by consideration for surgery

**Staging**
- 3B: Vaginal and/or parametrial involvement
- 4A: Invasion of bladder and/or bowel mucosa

**Radiology**
- Vaginal involvement
- Parametrial involvement
  - MRI
- Bladder involvement
- Bowel involvement
Parametrial Involvement

- Parametrium
  - Anatomical space lateral to the cervix

Sagittal T2
Parametrial Involvement

- Parametrium
  - Anatomical space lateral to the cervix
- MRI has a high negative predictive value
  - Intact low T2 signal cervical ring excludes parametrial invasion

Sagittal T2
Parametrial Involvement

- **Parametrium**
  - Anatomical space lateral to the cervix
- MRI has a high negative predictive value
  - Intact low T2 signal cervical ring excludes parametrial invasion

Sagittal T2
Parametrial Involvement

- Parametrium
  - Anatomical space lateral to the cervix
- MRI has a high negative predictive value
  - Intact low T2 signal cervical ring excludes parametrial invasion

Sagittal T2
Parametrial Involvement

- Parametrium
  - Anatomical space lateral to the cervix
- MRI has a high negative predictive value
  - Intact low T2 signal cervical ring excludes parametrial invasion
Parametrial Involvement

Axial T1 Fat Sat Post

Axial T2
Parametrical Involvement

Axial T1 Fat Sat Post

Axial T2
Parametrial Involvement

Axial T1 Fat Sat Post

Axial T2
Parametrical Involvement

Axial T2
Bladder Involvement
Bladder Involvement
Bowel Involvement
Bowel Involvement
Bowel Involvement
Bowel Involvement
Palliative Therapy/Clinical Trials

**Staging**
- 4B: Distant metastases

**Radiology**
- Distant metastasis
Palliative Therapy/Clinical Trials

Staging
- 4B: Distant metastases

Radiology
- Distant metastasis
- CT or PET/CT
Distant Metastasis
Distant Metastasis
Distant Metastasis
Type 1 Endometrial Cancer Staging

- Findings that change management:
  - Cervical stromal invasion
  - Adnexal involvement
  - Adenopathy
  - Parametrial involvement
  - Vaginal involvement
  - Bladder involvement
  - Bowel involvement
  - Distant metastasis
WHO Classification of Uterine Tumors

- Epithelial
  - Precursors
    - Endometrial hyperplasia without atypia
    - Endometroid intraepithelial neoplasia
  - Endometrial carcinoma
  - Tumor like lesions
    - Polyp
    - Metaplasias
    - Arias-Stella reaction
    - Lymphoma-like lesion
- Mesenchymal
  - Endometrial stromal and related tumors
  - Leiomyosarcoma
  - Smooth muscle tumor of unknown malignant potential
  - Leiomyoma
  - Miscellaneous
- Mixed epithelial and mesenchymal
  - Carcinosarcoma
  - Adenosarcoma
  - Adenomyoma
  - Adenofibroma
  - Atypical polypoid adenomyoma
- Miscellaneous
  - Adenomatoid tumors
  - Neuroectodermal tumors
  - Germ cell tumors
  - Lymphoid and myeloid tumors
  - Secondary tumors

Kurman RJ, et al. WHO Classification of Tumours of Female Reproductive Organs. 2014.
Endometrial Hyperplasia

Conclusion

- 2 pathologic entities
  - Benign hyperplasia
  - Endometrial Intraepithelial Neoplasia
Endometrial Hyperplasia

Conclusion

- 2 pathologic entities
  - Benign hyperplasia
    - Estrogen excess
  - Endometrial Intraepithelial Neoplasia
    - Genetic mutations
Endometrial Hyperplasia

Conclusion

- 2 pathologic entities
  - Benign hyperplasia
  - Endometrial Intraepithelial Neoplasia
- Thickened endometrium
  - Post menopausal
    - 5mm and over
  - Pre menopausal
    - 15mm and over
  - Not specific
WHO Classification of Uterine Tumors

- **Epithelial**
  - Precursors
    - Endometrial hyperplasia without atypia
    - Endometroid intraepithelial neoplasia
  - Endometrial carcinoma
  - Tumor like lesions
    - Polyp
    - Metaplasias
    - Arias-Stella reaction
    - Lymphoma-like lesion

- **Mesenchymal**
  - Endometrial stromal and related tumors
  - Leiomyosarcoma
  - Smooth muscle tumor of unknown malignant potential
  - Leiomyoma
  - Miscellaneous

- **Mixed epithelial and mesenchymal**
  - Carcinosarcoma
  - Adenosarcoma
  - Adenomyoma
  - Adenofibroma
  - Atypical polypoid adenomyoma

- **Miscellaneous**
  - Adenomatoid tumors
  - Neuroectodermal tumors
  - Germ cell tumors
  - Lymphoid and myeloid tumors
  - Secondary tumors

Kurman RJ, et al. WHO Classification of Tumours of Female Reproductive Organs. 2014.
Endometrial Polyp

Conclusion

- Localized proliferation of endometrial glands and stroma with a surface layer
Endometrial Polyp

Conclusion

- Localized proliferation of endometrial glands and stroma with a surface layer

- Ultrasound
  - Hyperechoic lesion
  - Feeding artery
Endometrial Polyp Conclusion

- Localized proliferation of endometrial glands and stroma with a surface layer
- Ultrasound
  - Hyperechoic lesion
  - Feeding artery
- MRI
  - Iso to low T2 signal
  - Enhancement
Endometrial Carcinoma

Conclusion

- Two types
  - Type 1
    - Arise from unopposed estrogenic stimulation
    - Most common
Endometrial Carcinoma Conclusion

- Two types
  - Type 1
    - Arise from unopposed estrogenic stimulation
  - Type 2
    - Arise from pathologic mutations (p53, etc.)
    - Worse prognosis
Endometrial Cancer on Ultrasound

- Thickened endometrial double layer thickness
  - Post menopausal: 5mm and over
  - Pre menopausal: 15mm and over
- Irregular endometrial-myometrial interface
- Irregular vascularity
- Hematometra
- Myometrial invasion
Endometrial Cancer on Ultrasound

- Thickened endometrial double layer thickness
  - Post menopausal: 5mm and over
  - Pre menopausal: 15mm and over
- Irregular endometrial-myometrial interface
- Irregular vascularity
- Hematometra
- Myometrial invasion
  - Only specific finding
Endometrial Cancer on Ultrasound

- Thickened endometrial double layer thickness
  - Post menopausal: 5mm and over
  - Pre menopausal: 15mm and over
- Irregular endometrial-myometrial interface
- Irregular vascularity
- Hematometra
- Myometrial invasion
  - Only specific finding
Type 1 Endo Ca Staging and Treatment

- Total Hysterectomy (TH) and Bilateral salping-oophrectomy (BSO) followed by consideration for adjuvant treatment
  - Stage 1: Tumor confined to uterus
- Adjuvant Treatment considered before or after TH/BSO
  - Stage 2: Cervical stromal invasion, not beyond the uterus
- TH/BSO followed by adjuvant treatment
  - Stage 3A: Tumor invades serosa or adnexa
  - Stage 3C1: Pelvic node involvement
  - Stage 3C2: Para-aortic involvement
- Radiation therapy and/or chemotherapy followed by consideration for surgery
  - Stage 3B: Vaginal and/or parametrial involvement
  - Stage 4A: Invasion of bladder and/or bowel mucosa
- Palliative Therapy/Clinical Trials
  - Stage 4B: Inguinal adenopathy or Distant metastasis

Endometrial Cancer Staging

- Findings that change management:
  - Cervical stromal invasion
  - Adnexal involvement
  - Adenopathy
  - Parametrial involvement
  - Vaginal involvement
  - Bladder involvement
  - Bowel involvement
  - Distant metastasis
Thank you!