Normal Anatomy of the Female Pelvis

Mani Montazemi, RDMS
Clinical Instructor – Imaging Manager
Baylor College of Medicine
Division of Maternal Fetal Medicine
Department of Obstetrics and Gynecology
Texas Children’s Hospital, Pavilion for Women
Houston Texas

Sagittal Scan

- Longitudinal, vertical planes
- Divide the body into left & right

Sagittal Scan

AP

Sagittal Scan

H F P

Sagittal Scan

Sagittal Scan
• Horizontal planes
• Divide the body into superior & inferior
**Uterus**

Located in Pelvis Between Bladder & Rectum

**Vagina**

- Lies between the urinary bladder & rectum
- The vaginal canal is indicated by the bright line separating the anterior and posterior walls

**Vagina**

- The vaginal canal helps to identify the midline view of the uterus
- Helps to distinguish lateral displacement of the uterus

**Vagina**

- If the hymen is imperforated at menarche the vagina will fill with blood, forming a hematocolpos
Vagina

• Lower cylindrical neck of the uterus which projects into vagina

Cervix

• Internal os
  – Junction of the uterine cavity and endocervical canal
• External os
  – Junction of the endocervical canal and vagina

Uterus

• Cervix
• Body
• Fundus
Layers of Uterus

1. Endometrium
   - Inner layer which varies in thickness & echo pattern
     with stage of the menstrual cycle
2. Myometrium
   - Thick, middle muscle layer
3. Serosa
   - Thin outer layer
Endometrium
- central stripe
- inner functional layer
- outer basal layer

Endometrium Thickness
- Thickness and echotexture depend upon hormonal status

Normal Endometrial Cycle
- Early Proliferative Phase: Linear Echogenic
- Late Proliferative Phase: Multilayered
**Normal Endometrial Cycle**

**Secretory Phase**

- Homogeneously Echogenic

**Endometrial Appearance**

- Under influence of estrogen & progesterone
- The glandular epithelium secretes a glycogen rich fluid
- Spiral arteries become tortuous

**Premenopausal Endometrium**

- Basal layer remains thin & hyperechoic throughout the menstrual cycle

**Intermenstrual Bleeding**

*When should the ultrasound examination be performed?*

- Immediate Postmenstrual Phase
- The endometrium is thin in this phase & small endometrial lesions are least likely to be obscured
Endometrial Thickness

1-3 mm
“Early Proliferation Phase”

4-7 mm
“Late Proliferation Phase”

8-15 mm
“Secretory Phase”

Endometrial Appearance

Mani Montazemi, RDMS
Female Anatomy
Endometrial Thickness

Postmenopausal < 5mm

How to Measure?

SAG

TRV

How to Measure?

SAG

TRV

Endometrial Measurements

• Not included in measurement:
  – fluid/debris in canal
  – subendometrial halo
**Endometrial Measurements**

- **Postmenopausal Endometrium**
  - The endometrium becomes atrophic
  - Appears as a thin echogenic line 4-5 mm thick

- Small amounts are common, especially in women receiving HRT
  - Aids in evaluating the appearance of the endometrium
**Uterine Positions**

- **Anteverted**
  - Tilted forward
- **Anteflexed**
  - Forward fold between the body & the cervix
- **Retroverted**
  - Tilted backwards
- **Retroflexed**
  - Flexed between body & cervix

**Uterine Shape**

- **Childhood**
  - Cylindrical shape
  - Corpus shrinks due to withdrawal of maternal hormones
  - Will not grow until ovaries produce hormones
- **Puberty**
  - Assumes the pear shape
- **Menopausal**
  - Shrinks & regress to prepubertal state

**Uterine Size**

- **Childhood**
  - 2/3 cervix, 1/3 body & fundus
- **Puberty**
  - 1 to 1 ratio between cervix body & fundus
- **Adult**
  - 1/3 cervix, 2/3 body & fundus
Uterine Measurements

$8 \text{ Length} \times 5 \text{ Width} \times 3 \text{ AP cm}$
**Uterine Measurements**

**Ovary**

- Range in size according to the age

\[
3 \text{ Length} \times 2 \text{ Width} \times 1 \text{ AP cm}
\]

**Ovary**

- Volume
  - \( L \times W \times H / 2 \)
  - Adults – 9.8 cm\(^3\) (+/-5.8)
  - Girls until about 5 yrs of age – < 1 cm\(^3\)
  - Menarche – 4.2 cm\(^3\) (+/-2.3)

**Ovarian Volume**

\[
3 \times 2 \times 2 / 2 = 6 \text{ cm}^3
\]
Follicular Cysts

- < 2.5 cm in diameter
- Cysts are usually larger than a mature follicle (3-8 cm)
- Thin walled and unilocular
- Usually unilateral
- Can be multiple and bilateral

Normal Anatomy of the Female Pelvis

Thank You