Pelvic Floor Relaxation

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Introduction

• Pelvic floor disorder (PFD) may be one of the fastest growing imaging areas.
• About 50% of postmenopausal women have symptoms of PFD.
• Estimated lifetime risk of at least 1 surgical procedure for PFD is 20%.
• Imaging for PFD is projected to increase by 45% in 30 years.

Clinical Factors PFD

- Female (rarely male)

- Risk factors: age, increased BMI, multiparity, decreased estrogen & menopause, poor collagen

- Weakness of pelvic floor muscles & supporting structures

- 2 main clinical presentations: stress urinary incontinence (SUI) and pelvic organ prolapse (POP)
<table>
<thead>
<tr>
<th><strong>Clinical Presentation PFD</strong></th>
<th><strong>Stress Urinary Incontinence (SUI)</strong></th>
<th><strong>Pelvic Organ Prolapse (POP)</strong></th>
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<tr>
<td>• Leakage of urine during exercise, coughing, laughing, straining</td>
<td>• Abnormal descent of pelvic organs - bladder (cystocele), vagina/uterus, small bowel (enterocele), or rectum (rectocele)</td>
<td>• Symptoms can include: vaginal pressure or bulge, urinary dysfunction, dysfunctional defecation, pelvic pain, dyspareunia</td>
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Equipment

- Optimal US equipment for transperineal US include a digital curvilinear 3D transducer with frequencies ranging between 4-2 MHz.
- Large mechanical 3D transducers are generally too wide to use on the perineal surface.
- Tightly curved transvaginal 3D transducers usually have too limited a field of view.
- 3D: useful for transverse documentation
- Cine clips: useful for documenting abnormal movement
Normal Transperineal Anatomy

Transverse 3D Ultrasound

- Transverse 3D images are reconstructed from a transperineal sagittal 3D clip.

S=symphysis   U=Urethra   V=Vagina  R=Rectum  Arrow=puborectalis
Stress Urinary Incontinence (SUI)

- Mid-urethral Sling:
- 2 Main Types: Retropubic Sling (RPS) and Transobturator Tape (TOT)

Pelvic Organ Prolapse (POP)

- Synthetic Vaginal Mesh
- 2 Surgical Techniques: Transvaginal vs. Transabdominal

Sonography Useful to Identify Surgical Treatments PFD
Sonography: Stress Urinary Incontinence Treatment
Mid-urethral Sling

Parasagittal Transperineal Sonogram

Sling or tape (arrowhead) appears as echogenic line on the 2D parasagittal plane

U=Ureter  V=Vagina  R=Rectum  S=Symphysis
B=Bladder  Arrow=suburethral tape sling
Stress Urinary Incontinence Treatment

Retropubic Sling

Coronal

Transverse

3D Transverse Sonogram

\( S = \text{Symphysis} \)
\( U = \text{Ureter} \)
\( V = \text{Vagina} \)
\( R = \text{Rectum} \)
\( B = \text{Bladder} \)

Arrow = suburethral tape sling

Sling is echogenic ribbon around urethra.
Stress Urinary Incontinence Treatment
Transobturator Tape

3D Transverse Sonogram

U=Ureter  V=Vagina  R=Rectum  S=Symphysis  B=Bladder
Arrow=suburethral tape sling
Pelvic Organ Prolapse Treatment
Sonographic Appearance Mesh (and Tape)

Sagittal Mesh Appearances:
1. short echogenic line
2. long echogenic line
3. multiple short linear echogenic pattern
4. dash-dot-dash echogenic pattern

Thin arrows = mesh between vagina and rectum
Thick arrow = suburethral tape sling
B = Bladder
V = Vagina
Pelvic Organ Prolapse Treatment
Sonographic Appearance Mesh

Mesh is thin so is difficult to document
3D multiplanar feature increases the flexibility of the imager to demonstrate this material

Circle = mesh sling for incontinence. Curved plane of mesh allows only part of mesh to be demonstrated posterolateral to urethral (U).

3D Oblique coronal transperineal Sonogram
Urinary Dysfunction
Bladder Prolapse (Cystocele)

Symptoms: difficulty voiding, pelvic pressure

US findings: posterior wall of bladder bulges posteriorly and inferiorly causing vaginal wall descent. These findings are worsened by Valsalva.

B=bladder
U=urethra
C=cystocele
V=vagina
Urinary Dysfunction
Bladder Funneling

Symptoms: stress incontinence, urinary leakage
US findings: base of bladder is funnel shaped due to weakness in internal urethral meatus. Funneling may be visible only with Valsalva. Occasionally, also seen at rest.

B=bladder
U=urethra
V=vagina
R=rectum
S=surgical tape sling
Arrow=funneling

REST VALSAVA
Urinary Dysfunction
Urethral Diverticulum

Symptoms: multiple bladder infections, urinary frequency, urgency, burning with voiding
US findings: focal asymmetric urethral enlargement, occasionally containing stones

B=bladder
U=urethra

Double headed arrow=urethral diverticulum
Urinary or Bowel Dysfunction
Uterine Prolapse

Symptoms: pelvic pressure; urinary leakage or retention; difficulty with bowel movements

US findings: cervix below the base of the bladder

B=bladder
C=cervix
S=surgical tape sling
U=urethra
Rectal Dysfunction
Rectocele

Symptoms: soft tissue bulge in vagina, difficult bowel movement, incomplete emptying of rectum, rectal pressure

US findings: bulge of anterior rectal wall which may be worse with Valsalva

BLD=bladder
REC=rectum
U=urethra
VAG=vagina
Arrow=rectocele
Post Operative Complications
Symptoms

- Pain—most common symptom (31% of all symptoms)
- Bleeding
- Dyspareunia
- Urinary problems
- Neuromuscular problems
- Bowel problems
Post Operative Complications Imaging Findings

- Erosion or perforation of sling or mesh into pelvic organs (35% of complications; most common complication)
- Fragmentation or displacement of the transurethral sling or mesh
- Fistula formation
- Infection including abscess
- Scaring, narrowing or kinking of pelvic orifices or organs
- Recurrence of prolapse or incontinence
Erosion of Mesh/Sling into Adjacent Organs

73 yo woman, 5 years after vaginal pelvic mesh for organ prolapse, presents with multiple urinary tract infections and leakage.

US findings: Cystocele present. Vaginal mesh (arrow) eroded and perforated into bladder. Fragment (arrowhead) visible within bladder (B). Rectum (R)
72 year old woman, 5 years after surgical mesh and tape repair of organ prolapse, has pelvic pain and dyspareunia.

US findings: on right side of bladder (B), there are multiple hyperechoic linear structures which are fragments (arrows) from previous vaginal sling and pelvic mesh procedures.
50 year old woman with urinary leakage and pelvic pain. She had previous vaginal mesh repair after removal of vaginal cyst.

US findings: surgical mesh (arrow) has eroded through the vaginal (V) wall and also through the urethra (U). Bladder (B), Symphysis (S), Rectum (R)
Kinking of Rectum

43 year old presents with incontinence, dyspareunia and difficulty with bowel movements, 1 year after cystocele and rectocele repair.

US findings: Cystocele (C) present. Kink (arrow) in rectum at point of mesh repair. With Valsalva, rectocele (arrowhead) appears distal to kink. Bladder (B) Urethra (U), Vagina (V)
Conclusion

- Transperineal US is an excellent method to evaluate patients who have symptoms of pelvic floor dysfunction or who develop complications after surgical treatment for pelvic floor dysfunction.

- Optimal US examination of pelvic floor dysfunction includes 2D, 3D and cine sonography.
References


