Mesh and Slings: Post-Operative Imaging in the Pelvic Floor

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Objectives

- Interventions for stress urinary incontinence and pelvic organ prolapse
- MR imaging of synthetic material in the pelvic floor
- Normal/abnormal appearance of pelvic floor synthetic material
Pelvic Floor Dysfunction

- Complex and multifactorial set of conditions
- Affects 1 in 4 women in the USA\textsuperscript{1}
- Includes
  - Pelvic organ prolapse (POP)
  - Stress urinary incontinence; urinary retention
  - Chronic pelvic pain
  - Defecatory dysfunction

\textsuperscript{1}JAMA 2008;300:1311-6
Pelvic Floor Surgical Options

Stress Urinary Incontinence (SUI)
- urethral Bulking Agents
- Pubovaginal Slings
  - Mid-urethral Slings
    - Retropubic (RP) Sling
    - Transobturator Tape (TOT)
    - Single Incision Sling (Mini-sling)

Pelvic Organ Prolapse (POP)
- Native Tissue Repair
- Biologic/absorbable Graft
- Synthetic Vaginal Mesh
- Sacrocolpopexy
Indications for Imaging

- Asymptomatic patients
  - Objective post-surgical measure\textsuperscript{2-5}
- Symptomatic patients
  - Identify synthetic material – surgical “road map”, identify complications
  - Recurrent SUI or prolapse

\textsuperscript{1}Acta Radiol. 2014;55(4):495-504
\textsuperscript{3}Int Urogynecol J. 2012;23(11):1569-76
\textsuperscript{4}Int Urogynecol J. 2013;24(7):1151-9
Imaging Techniques

- Ultrasound
- Magnetic Resonance Imaging (MRI)
- Computed Tomography
- Voiding Cystourethrogram
# MRI “Pelvis Mesh Protocol”

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Plane</th>
<th>FOV (cm)</th>
<th>Slice (mm)</th>
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<tbody>
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<td>25</td>
<td>4</td>
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<tr>
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<tr>
<td>T1 3D FS GRE post</td>
<td>Axial</td>
<td>24</td>
<td>3</td>
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</tbody>
</table>
Urethral Bulking Agents

- Injected into spongiform tissue
- Various products; E.g. Collagen, Macroplastique®, Coaptite®, Durasphere™
- Potential complications
  - Migration
  - Urinary retention, UTI
  - Recurrent SUI
- Visualized on both Ultrasound and MRI

Urethral Bulking Agent – MRI Findings

- Hyper/hypointense on T2w images
- Circumferential around lumen
- **No enhancement**
- DDX: Urethral Diverticulum
- Periurethral migration

Khatri et al. Radiographics 2016; 36:1233-1256
Mid-Urethral Slings

Khatri et al. Radiographics 2016; 36:1233-1256

Advantage Fit™ Transvaginal Mid-Urethral Sling System
http://www.bostonscientific.com

Khatri et al. Radiographics 2016; 36:1233-1256
Mid-urethral Slings – MRI Findings

MRI

- Hypointense on T2w images
- Location: Mid-urethra
- Retropubic, suprapubic space
- Difficult to differentiate from scar tissue
- Evaluate for bladder erosion
- Evaluate for infection/collection
**Retropubic Sling – MRI**

‘U-shaped’ hypointense curvilinear structure extending into RP space

*Travesses the rectus in the suprapubic space*

Slit-like on end appearance of sling arms in the RP space on Coronal

*Linear appearance in RP space on Sagittal*

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Khatri et al. Radiographics 2016; 36:1233-1256

Khatri et al. Radiographics 2016; 36:1233-1256
Prolapse Repair - Synthetic Vaginal Mesh

Khatri et al. Radiographics 2016; 36:1233-1256
Vaginal Mesh – MRI Findings

- Hypointense on T2w images
  - Mesh body - along vaginal wall(s)
  - Mesh arms – extend to levator muscles, SC ligaments, ischiorectal fossa, obturator foramen
- Mimic: Scar tissue
- Complications: Infection, collections, extrusion
Mesh Extrusion – MRI

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Khatri et al. Radiographics 2016; 36:1233-1256

Khatri et al. Radiographics 2016; 36:1233-1256
Prolapse Repair - Sacrocolpopexy (SC) Mesh

Khatri et al. Radiographics 2016; 36: 1233-1256
Sacrocolpopexy Mesh – Imaging Findings

- **MRI**
  - Sacral promontory to vaginal apex
  - Hypointense on T2w images
  - Right curvature along course in the pelvis
- **Mesh infection**
  - Thick with high SI on T2w
  - Fluid collection/gas?
  - Bone edema at sacrum
Normal Sacrocolpopexy Mesh - MRI

Sag T2w

Sag T2w
Sacrocolpopexy Mesh, Vaginal Discharge, Pain

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Summary – Imaging Synthetic Material

- Different products – Bulking agents, Slings, Mesh
- Goal – identify synthetic material, complications, provide roadmap
- **Bulking agents** – no enhancement
- **MRI → Retropubic** visualization
- **Slings/mesh** – hypointense on T2w; curvilinear
- **SC mesh** – promontory to vaginal apex
- Challenge – **scarring vs. mesh/sling** material

*Khatri et al. Radiographics 2016; 36:1233-1256*
Thank you for your attention

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