Laparoscopic Level II Suspension: Laparoscopic Burch colposuspension, para-vaginal repair

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Stress urinary incontinence (SUI)
Urodynamic stress incontinence (USI)
Stress urinary incontinence (SUI)

- SUI is the most common type of urinary incontinence in women under age 60 \([1,2]\).  
- Mixed incontinence, or SUI combined with urge incontinence, is the most prevalent type of incontinence in older women \([3]\).
- SUI vs USI
  - Symptoms,
  - Signs
  - **Condition**: Urodynamic stress incontinence (USI)

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TYPES OF SURGICAL PROCEDURES

Current approaches to surgical treatment of SUI

• Mid-urethral slings
  – retropubic, eg, TVT, SPARC
  – Transobturator, e.g. TVT-O, TOT
  – Ond-incision MUS

• Proximal suburethral fascial slings

• Colposuspension, open or laparoscopic (Burch, Marshall-Marchetti-Krantz)

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TYPES OF SURGICAL PROCEDURES

- Burch Colposuspension
- Fascial Sling
- Tension-free Vaginal Tape
The selection of a definitive incontinence procedure depends on:

- The need for laparotomy to treat other pelvic pathology (e.g., hysterectomy for leiomyomas)
- Coexistent pelvic organ prolapse that requires vaginal repair (e.g., cystocele)
- Health status and age of the patient
- Presence of intrinsic sphincter deficiency
- Skill and experience of the surgeon
Laparoscopic (LSC) Burch colposuspension

- was one of the first minimal access operations for the treatment of women with stress urinary incontinence
- presumed advantages
  - avoiding major incisions,
  - shorter hospital stay
  - quicker return to normal activities.

Dean NM et al. 2006 Cochrane review
Laparotomy, Burch colposuspension

pectineal (Cooper's) ligaments
MMK vs Burch

perioisteum of the posterior pubic symphysis

pectineal (Cooper's) ligaments

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LSC Burch colposuspension

http://urology.jhu.edu/
LSC Burch colposuspension
• Upon entering the abdominal cavity, the bladder is identified.

http://www.laparoscopy.com
• The retropubic space of Retzius is entered. The bladder and the urethra are carefully dissected from their retropubic attachment.
http://www.laparoscopy.com
The retropubic space of Retzius has been dissected exposing both Cooper ligaments and the endopelvic fascia.
http://www.laparoscopy.com
Using a double gloved hand the vagina is pushed up while the instrument exposes the perivaginal fascia.

http://www.laparoscopy.com
Paraurethral supporting stitches are placed incorporating all but the vaginal mucosa.

http://www.laparoscopy.com
• The sutures are secured to the Cooper's ligament in the Burch procedure seen here. In the Marshall-Marchetti-Krantz operation the supporting sutures are placed in the periosteum of the posterior symphysis pubis.
This picture shows how the sutures approximate the paraurethral tissue to the Cooper’s ligament.

http://www.laparoscopy.com
Additional sutures are placed laterally, creating a supporting sling of the anterior wall and elevating the urethra.
Modification

1976 Tanagho:
1980 Hodgkinson:
Suture vs Mesh & staples
Technical tips

• using nonabsorbable materials, such as Ethibon or Gortex.

• avoid over-correcting the vesicourethral angle and urethral position
  – "one can easily insert two fingers between the pubic bone and urethra".
  – Offer support layer not compression
  – Hammock theory
Hammock theory -- Abdominal pressure on urethra and pelvic floor

DeLancey JOL 19994 Am J Obstet Gynecol:
Technical errors

• Placement of sutures in the bladder instead of the endopelvic fascia
• Sutures positioned too laterally from the urethra or too far distally
• Excessive tension or elevation of the urethra
• Inadequate depth of sutures in the endopelvic fascia with subsequent pull through.

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Technical errors

Correct

Incorrect

Public symphysis

Medial placement of sutures

Public symphysis

Sutures too lateral

Vagina

Rectum

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Open versus laparoscopic approach

- **Subjective** cure rates were similar after open and laparoscopic procedures, 58 to 96 and 62 to 100 %, respectively.
- **Objective** clinical outcomes (i.e., leakage on stress testing and urodynamic testing) were slightly better for open colposuspension
  - (RR 0.90, 95% CI 0.85-0.96).

- Two subsequent randomized trials reported patient satisfaction at 24 months
  - not significantly different for the open and laparoscopic procedures
  - (open: 55 and 70 % satisfied, laparoscopic: 55 and 58 % satisfied) [39,40].
Open versus laparoscopic approach

• There were no significant differences postoperative voiding dysfunction.
• There were significantly fewer overall perioperative complications in the laparoscopic group
  – (RR 0.72, CI 0.54-0.97),
• more bladder injuries in laparoscopic group
  – (RR 2.37, CI 1.03-5.48).

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Cochrane evidence summary
Laparoscopic techniques

- Significantly higher subjective and objective one-year cure rates were found for women randomized to two paravaginal sutures compared with one suture in a single trial;
  - Subjective 89 vs 65 %
  - Objective 83 vs 58 %

- compared sutures with mesh and staples for laparoscopic colposuspension and showed a trend towards favoring the use of sutures.

Dean NM et al. 2006 Cochrane review
Cochrane evidence summary
LSC vs self-fixing vaginal sling

- Eight studies
- There were no significant differences in the reported subjective cure rates of the two procedures
  - but objective cure rates at 18 months favored slings.
- No significant differences were observed for postoperative voiding dysfunction and perioperative complications.
- LSC had a significantly longer operation time and hospital stay.

Dean NM et al. 2006 Cochrane review
Laparoscopic vs midurethral sling

- TVT was associated with more intraoperative complications
  - (eg, bladder or vaginal injury) than colposuspension,
- TVT had a more favorable postoperative course:
  - less use of opiate analgesia (21 vs 91 %),
  - shorter duration of catheterization and hospitalization (median 1 vs 5 days),
  - quicker return to work and to full activity (3 to 4 wks vs 6 to 10 wks).
Complications

• Urinary retention
  – how tightly the suspension sutures are pulled: stabilization not tensioning
  – a preoperative urodynamic study: abd straining
• Detrusor overactivity
  – Excessive bladder neck elevation and urethral compression
• Injury to the bladder or ureter
  – Routine intraoperative cystoscopy should be performed
• Infection
• Hemorrhage
• Enterocele

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Risk factors associated with lower success rates

- Urodynamic testing confirms long-term success rates of 70 to 90% for the Burch procedure [49-52].
- lower success (approximately 60%)
  - women with mixed incontinence
  - under age 50 with urethral closing pressure <20 cm of water [22,53,54].
  - Obesity,
  - asthma,
  - age over 65 years,
  - estrogen deficiency [55].
Pelvic Organ Prolapse (POP)

**MUSCULAR CONTRACTION**

- ↓ = abdominal pressure
- ρ = pelvic organs
- ○ = abdominal cavity
- ↘ = muscular contraction
- | = genital hiatus

**FIXATION BY LIGAMENTS**
<table>
<thead>
<tr>
<th>Level</th>
<th>Fixation by</th>
<th>Anatomical structure</th>
<th>defect leads to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>suspension</td>
<td>Parametrium/paracolpium</td>
<td>prolapse</td>
</tr>
<tr>
<td>Level 2</td>
<td>connection (tissue-mediated)</td>
<td>connection of vagina to arcus tendineous fasciae pelvis (Fascia pubocervicalis, Fascia rectovaginalis)</td>
<td>cystocele (lateral defect type) rectocele</td>
</tr>
<tr>
<td>Level 3</td>
<td>tensioning</td>
<td>direct fixation of vagina to surrounding structures by ligaments (Ligg. pubourethralia)</td>
<td>incontinence</td>
</tr>
</tbody>
</table>
Level I: utero-sacral ligament cardinal complex (C-USL)
Level II: ATFP (White line)
Level II: attachment

- Pubocervical fascia
- Paracolpium
- Rectovaginal fascia
- Arcus tendineus fasciae pelvis
- Top of perineal body
- Urethra
- Rectum
- Levator ani
Anterior wall defect: Cystocele
Site of midline defects
Site of paravaginal defects
Site of transverse defects
Bladder
Laparoscopic para-vaginal repair
Para-vaginal repair (lateral type)
Evidence Summary

- A few retrospective observational studies have reported success rate ranging from 76 to 93% – similar to abdominal and vaginal approach (76 -100 %), (Price 2009 Maturitas).

- The success rate of anterior colporrhaphy is poor and varies widely between 37 and 100% (Maher 2004 Cochrane Review).

- The use of mesh or graft inlays at the time of anterior repair may reduce the risk of recurrence – (RR 1.39, 95%CI 1.02- 1.90) (RR 2.72, 95%CI 1.20- 6.14)
Discussion

• Bladder injury (2.3%), blood loss, bowel injury and unintended laparotomy were the potential complications (Miklos 2002 Curr Opin Obs Gyn).

• Short-term studies support the use of laparoscopy in urogynecology and reconstructive pelvic surgery.

• However, longer term studies are needed to confirm these findings (Diwadkar GB 2008 Curr Opin Obs Gyn).
Options

- Anterior Bridge Repair
- Posterio Bridge Re
- Lateral Fornix Repairs
Options

Sacropexy (Posterior IVS)

Slingplasty
Chi Mei Museum

Ole Bull Giuseppe Guarneri del Gesù
1744 Italy-Cremona