W24: Approaches to Pelvic Organ Prolapse Surgery
Workshop Chair: Philippe Zimmern, United States
27 August 2013 14:00 - 17:00

<table>
<thead>
<tr>
<th>Start</th>
<th>End</th>
<th>Topic</th>
<th>Speakers</th>
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<tbody>
<tr>
<td>14:00</td>
<td>14:30</td>
<td>Goals of repair and anatomical principles</td>
<td>Kimberly Kenton</td>
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<td>14:30</td>
<td>15:00</td>
<td>Vaginal repairs</td>
<td>Sandip Vasavada</td>
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<td>15:00</td>
<td>15:30</td>
<td>Laparoscopic repair &amp; use of mesh</td>
<td>Kimberly Kenton</td>
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<td>16:00</td>
<td>16:30</td>
<td>Robotic repairs</td>
<td>Philippe Zimmern</td>
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<td>16:30</td>
<td>16:50</td>
<td>Assessment of outcomes</td>
<td>Sandip Vasavada</td>
</tr>
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<td>16:50</td>
<td>17:00</td>
<td>Case discussion and Q&amp;A</td>
<td>Kimberly Kenton, Sandip Vasavada, Philippe Zimmern</td>
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</tbody>
</table>

**Aims of course/workshop**
This course is intended to update the reconstructive pelvic surgeon and all interested trainees on the pros and cons of modern surgical approaches in the management of pelvic organ prolapse. This interactive course will feature concise lectures on current debates with each approach, including robotic surgery. The course will include multiple surgical video clips, and provocative case discussions to enhance the interaction with the audience.
APPROACHES TO PELVIC ORGAN SURGERY

Thursday, 30 May 2013, 09:50:25 GMT

Chair: Philippe E. Zimmern, MD
Speakers: Kimberly Kenton, MD
Sandip Vasavada, MD

PROGRAM

Course Introduction Philippe Zimmern

00-30 1. Goals of Repair and Anatomical Principles Kim Kenton
30-60 2. Vaginal repairs Sandip Vasavada
60-90 3. Laparoscopic Repair & Use of Mesh Kim Kenton

Break 90-110

110-130 4. Robotic repair Philippe Zimmern
130-150 5. Assessment of Outcomes Sandip Vasavada
150-180 6. Case discussion and Q&A Moderator: Philippe Zimmern
GOALS OF PROLAPSE REPAIR

Kimberly Kenton MD, MS
Professor, Obstetrics & Gynecology and Urology
Division Chief, Female Pelvic Medicine & Reconstructive Surgery

Clinically Relevant Anatomy


POP-Q Staging: > 70 yrs (n=19)

Normal Support

- Connective tissue
  - Uterosacral ligaments
  - Cardinal ligaments
- Muscle
  - Levator ani
- Upper 2/3 vagina
  - Horizontal
  - Lay on levators
Why Worry About The Apex Anyway?

- Isolated anterior or posterior defects are RARE
- 1997 Hospital Discharge Survey
  - Isolated cystocele or rectocele repairs = 18% POP surgery
- > Stage II POP
  - Linear relationship: apex & anterior & posterior vaginal walls
  - Anterior or posterior vaginal wall is > Stage II → Apex is within 2 cm hymen

Relationship Between Anterior Compartment and Apical Prolapse

![Graph showing the relationship between anter... (Summers A et al. Am J Obstet Gynecol. 2006;194(5):1438-1443.)](image-url)
What About Other Factors?

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<th>$P$ value</th>
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<tr>
<td>Vaginal length</td>
<td>.77</td>
<td>.17</td>
<td>&lt;.001</td>
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</tbody>
</table>

77% explained by apex and length

Hsu Y et al. Int Urogynecol J Pelvic Floor Dysfunct. 2008;19(1):137-140

Clinical Implications

- Apical support is the dominant factor in cystocele
- Surgically correcting apical descent is important in cystocele cure
- Tie apex into cuff closure during vaginal hysterectomy

Posterior Compartment

- Posterior repair
  - 149 Stage III-IV POP; Isolated SCPXY

<table>
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<tr>
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<th>1-Year Post-OP Mean±SD</th>
<th>$P$ value</th>
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<td>Anterior vaginal wall (Ba)</td>
<td>3.5±2.7</td>
<td>2±1</td>
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<tr>
<td>Apex (C)</td>
<td>1±8</td>
<td>0±2</td>
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<tr>
<td>Posterior vaginal wall (Bp)</td>
<td>14±8</td>
<td>2±1</td>
<td>&lt;.0005</td>
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<tr>
<td>Genital hiatus (Gh)</td>
<td>0±2</td>
<td>3±1</td>
<td>.001</td>
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</tbody>
</table>

Concomitant repairs typically not necessary
Genital hiatus narrows with correction of apex
No need for concomitant anterior/posterior repair
Correction of apex corrects posterior and anterior vaginal wall defects
What about the muscle?

Do women with levator ani muscle defects have a higher operative failure rate than those without? Should we address the muscle surgically?

Is Levator Damage Seen More Often in Women With Pelvic Organ Prolapse Than in Normal Women?

- 151 cases (POP-Q ≥ +1)
- 134 controls (POP-Q ≤ -1)

Major Levator Ani Defects:  
Case-Control Study of Pelvic Organ Prolapse

So, how should we select the best

• Determine outcomes meaningful to patients
  • Know individual patient’s goals
  • Know procedures

• Optimize
  — Patient satisfaction
  — Patient outcomes
  — Patient quality of life

• Minimize
  — Complication
  — Recovery

Best method for assessing outcomes?

- Optimal method is unclear
- No consensus of what constitutes “success”
- Wide variety of definitions for “success”
  — Results in highly variable estimates of success
- Shift toward patient centered outcomes
Traditional Anterior, Posterior, and Apical Compartment Repairs
A Technique Based Review

Sandip Vasavada, MD
Center for Female Urology and Pelvic Reconstructive Surgery
The Glickman Urological and Kidney Institute
The Cleveland Clinic

“Traditional repairs vs Augmented repairs”

- Should we abandon “traditional repairs”?
- If no, then what situations to use
  - First time occurrence of prolapse
  - Thin tissues/atrophic
  - Sexually active patients?
- Constant need to “innovate” or “keep up”
- Is this because traditional repairs are doomed to failure…….

Systematic Review of all Prolapse Surgeries. From Diwadkar et al, (Obst and Gynec, Feb 2009)

- 249 articles
  - 19 conference abstracts
- 160 articles excluded
- 89 articles
  - 19 conference abstracts included
- Traditional vaginal: 54 studies
- Sacral colpopexy: 43 studies
- Vaginal mesh kits: 24 studies

Courtesy of Mark Walters
Results of Vaginal Mesh Kits

- 3425 patients
- Mean follow-up of 17.1 months
- Most common complications:
  - Mesh erosion or infection  5.8%
  - Fistulas  0.2%
  - Dyspareunia  2.2%

<table>
<thead>
<tr>
<th></th>
<th>Traditional Vaginal Repairs</th>
<th>Sacral Colpopexy</th>
<th>Mesh Kits</th>
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<tbody>
<tr>
<td>Total complication rate</td>
<td>15.3 (14.7-16.3)</td>
<td>17.1 (16.1-18.1)</td>
<td>14.5 (13.3-15.7)</td>
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<tr>
<td>Reoperation for prolapse recurrence</td>
<td>3.9 (3.5-4.4)</td>
<td>2.3 (1.5-2.7)</td>
<td>1.0 (1.0-1.7)</td>
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<tr>
<td>Total reoperation rate</td>
<td>5.8 (5.3-6.3)</td>
<td>7.1 (6.4-7.8)</td>
<td>8.5 (7.6-9.4)</td>
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### Complication Grade By Repair Group

<table>
<thead>
<tr>
<th>Grade</th>
<th>Traditional Vaginal Repairs</th>
<th>Sacral Colpopexy</th>
<th>Mesh Kits</th>
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<td>I</td>
<td>% 95% CI</td>
<td>% 95% CI</td>
<td>% 95% CI</td>
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<tr>
<td>Dindo</td>
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<td>6.9 6.4–7.6</td>
<td>5.8 5.2–6.4</td>
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<tr>
<td>IIIa</td>
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<td>1.0 0.7–1.2</td>
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<tr>
<td>IIIb</td>
<td>1.9 1.7–2.3</td>
<td>4.8 4.3–5.4</td>
<td>7.2 6.3–8.0</td>
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</table>

### Conclusions of Review

- Traditional vaginal procedures
  - Highest reoperation rate for prolapse recurrence
  - Lowest rates of complications that required surgical intervention
  - Lowest total reoperation rate

- Vaginal mesh kits
  - Shortest follow-up period
  - Highest rate of complications that required surgical intervention
  - Highest total reoperation rate (recurrence + complications)

### Challenges in Vaginal Prolapse Surgery

- **Anterior Vaginal Wall Prolapse**
- **Apical Prolapse**
  - At time of hysterectomy
  - Post-hysterectomy
- **Posterior Vaginal Wall Prolapse**
Anterior Vaginal Wall Prolapse

Four Defects of Anterior Vaginal Wall Prolapse

- Repair of central defect
  - re-approximation of widened pubocervical fascia
- Repair of lateral defect
  - Suspension/support of bladder base and apex
- Urethra and BN support
  - vaginal sling (if necessary), same or separate incision
- Cardinal ligament repair/ Bladder base/ Apex
  - dissection and approximation to midline

Anterior Vaginal Wall Prolapse

- Identify and correct all defects
- Central and lateral defects if possible....
- Evaluate potential other coexistent defects of pelvic organ support (e.g. enterocele, rectocele, vault mobility)
- Assess and address potential urethral incompetence
Traditional Cystocele Repair
Anterior Colporraphy+/- Absorbable Mesh

  - 109/114 patients underwent ant colporraphy 3 techniques
    - Standard
    - Standard+ mesh (polyglactin)
    - Ultralateral colporraphy
  - Evaluated by POP-Q
  - Median follow up was 23.3 months
  - 7% stage I preop, 37% stage II preop, 54% stage III preop, 2% stage IV
  - 30% satisfactory outcomes after standard colporraphy alone, 42% standard + mesh, and 46% ultralateral colporraphy
  - VAS: symptom severity improved overall (6.0 +/- 2.7 -> 1.1 +/- 0.8)
  - Addition of mesh did not seem to make a difference

Anterior Colporraphy

- Sand, PK et al. (Am J Obstet Gyn, June 2001)
  - Prospective randomized trial of stage 2 < cystocele with and without vicryl mesh
  - Follow up at 2, 6, 12, 52 weeks postop
  - 80 with mesh, 80 none
  - Technique: mesh reduction of prolapse only
  - After 1 yr, 43% patients without mesh and 25% with mesh had recurrence to mid vaginal plane (p = 0.2), concurrent slings may be protective as well
  - Mesh does make a difference

Conclusions

- The success rate of anterior colporrhaphy varies considerably depending upon the definition of treatment success used.
- When strict anatomic criteria are used, the success rate is low.
- When more clinically relevant criteria are used, treatment success is better with only 10% developing anatomic recurrence beyond the hymen, 5% developing symptomatic recurrence and 1% undergoing retreatment during the study follow-up.
**Objectives of Vaginal Vault Surgery**

- Preserve normal vaginal axis
- Minimize complication rates, blood loss, postoperative discomfort, and cost
- Repair all coexistent pelvic floor defects
- Attempt to restore
  - Vaginal anatomy
  - Visceral function
  - Sexual function
  - Quality of life
Vaginal Vault Suspension

- Many patients with significant prolapse have vault support weakness
- Many subsequent failures due to lack of vault suspension
- Resuspension of the vault anchors the anterior/posterior repair
- Why don’t many repair vault?
  - Not properly diagnosed
  - Lack of adequate training
  - Time consuming, complex procedures

Solid Support of the Vaginal Apex is the Cornerstone of a Good Vaginal Prolapse Repair

Transvaginal Procedures for Vaginal Vault Prolapse

- Modified McCall’s Culdoplasty
- Iliococcygeus Vaginal Vault Suspension
- Levator Myorrhaphy
- Sacrospinous Ligament Fixation (SSLF)
- High Uterosacral Vaginal Vault Suspension (USVVS)
- Total Vaginal Mesh Apical Suspension
- Colpocleisis
Abdominal Repairs for Vaginal Vault Prolapse

- Open Abdominal Sacrocolpopexy
- Open Uterosacral Ligament Suspension
- Laparoscopic Abdominal Sacrocolpopexy
- Robotic Sacrocolpopexy

Mayo/McCall culdoplasty

- Elevation of vaginal apex to high uterosacral ligament
- Proven efficacy in enterocele repair
- Wide experience in specific centers
- Reported high success rates
- Usefulness in complete prolapse in question
Mayo Culdoplasty

- 660 patients, posthysterectomy vault prolapse (TVH - 43%, TAH - 49%)
- questionnaire and/or telephone contact
- follow-up 11-22 yrs.
- satisfaction - 82%
- complications: bladder/bowel entry (2.3%), ureteral damage (0.6%), hematoma (1.3%)
- subsequent repairs - 5.2% none - 71%
- “bulge” - 11.5% none - 61.2%


Iliococcygeus suspension

- Transmucosal sutures placed to coccygeus fascia, bilaterally
  - inferior to white line, anterior to ischial spine
- Reported success rates similar to sacrospinous fixation
- Simplicity and decreased morbidity
- May allow for only 6-7 cm depth

Levator Myorrhaphy

• Transvaginal placement of sutures through levator complex and shelf towards midline to anchor upper vagina
• Similar in concept to Mayo Culpoplasty
• Uses #1 absorbable sutures thru neovaginal apex and into levator muscles bringing them towards the midline to contralateral side. Then, 2 purse string sutures to close enterocele sac
Exposing peritoneal sac

Vault suspension sutures

Out of peritoneal sac
1 cm from original entrance
Purse string sutures
Pre-rectal

Levator Myorrhaphy Results
- Lemack, GE et al (Eur Urol Dec 2001)
  - 35 patients (mean age 71, f/u 27.0 months)
  - 5 recurrent prolapse (3 ant enterocele, 1 vault)
  - 7/35 recurrent cystoceles (5 grade 1, 2 grade 2)
  - Satisfaction > 90% in 17/35
  - One ureteral injury

Sacrospinous Ligament Fixation
- Objective success 73-97%
- Various definitions of success
- Sites of failure often not specified
- Prospective trials:
  - ASC vs SSLF
  - Abd better (Benson)
  - Maher (equivalent)
Uterosacral Vaginal Vault Suspension

- Placement of sutures through “normal” vaginal apical suspension points
- Thought to be more physiologic suspension of apex
- Addresses level I and II support continuity
- Low, but not insignificant complication of ureteral injuries as the ligament is close to the ureters especially distally
### Uterosacral VVS Results

<table>
<thead>
<tr>
<th>First Author</th>
<th>Year</th>
<th>No</th>
<th>Follow-up (range)</th>
<th>Definition of anatomic success</th>
<th>Anatomic recurrence (range)</th>
<th>Anatomic recurrence by segment</th>
<th>Reoperation by POP</th>
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<tr>
<td>Jenkins</td>
<td>1997</td>
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<td>Comiter</td>
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<td>Barber</td>
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<td>Apex 1%</td>
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Posterior Compartment Repairs

Posterior Wall Prolapse

- May occur in up to 50% of patients with concomitant anterior and apical defects
- Rectocele
- Enterocele
- Sigmoidocele
- perineocele

Rectocele repairs when to do?

- Symptomatic
  - Defecatory dysfunction
  - Digitation
  - Symptomatic bulge
- Asymptomatic: caution....
  - Size ??
  - Risks and benefits ?
  - Pain
  - Dyspareunia
- How about at time of sacrocolpopexy ?
PELVIC FLOOR REPAIR
Traditional

- **Rectocele repair** by plication of prerectal and pararectal fascia
- **Narrowing the levator hiatus** by approximation of levator fascia
- **Perineal repair** by approximation of bulbocavernous, transverse perineum and anal sphincter

Pelvic floor repair

- 1) Perineal triangle
- 2) Vaginal triangle
- 3) Pre rectal incision

Perineal incision
Dissection and excision

Posterior vaginal triangle

Dissect and excise posterior triangle
Dissection and excision posterior vaginal wall

PELVIC FLOOR REPAIR

- *Rectocele repair* by plication of prerectal and pararectal fascia
- *Narrowing the levator hiatus* by approximation of levator fascia
- *Perineal repair* by approximation of bulbocavernous, transverse perineum and anal sphincter

Inclusion of Pararectal and Prerectal fascia
Pelvic Floor Repair
Steps as Necessary

- **Rectocele repair** by plication of prerectal and pararectal fascia
- **Appropriately narrowing the levator hiatus** by approximation of levator fascia
- **Perineal repair** by approximation of bulbocavernous, transverse perineum and anal sphincter

Re-approximation of levator hiatus

Perineal repair
Perineal repair

Standard Posterior Colporraphy

<table>
<thead>
<tr>
<th>Study</th>
<th>Mean Follow-up (mo)</th>
<th>Vaginal Repairs (%)</th>
<th>Urethral Diverticulum (%)</th>
<th>Fecal Incontinence (%)</th>
<th>De novo Rectovaginal Sepsis (%)</th>
<th>Patients, n (%)</th>
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<td>26</td>
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<td>35</td>
<td>35</td>
<td>56</td>
<td>0</td>
<td>4 (12)</td>
<td>14 (42)</td>
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<td>50</td>
<td>90</td>
<td>3</td>
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<td>57</td>
<td>90</td>
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Site Specific Repairs

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Conclusions

- Prolapse is an ever changing field
- Address apex if at all possible
- Mesh use data suggests better anatomic outcomes but are they using same “success criteria”?
- Traditional cystocele repairs probably “work” better than we give credit for
- Use rectocele repairs as necessary but maybe tide has changed in “prophylactic repairs”: use symptoms instead
LAPAROSCOPIC SACROCOLPOPEXY

Kimberly Kenton MD, MS
Professor, Obstetrics & Gynecology and Urology
Division Chief, Female Pelvic Medicine & Reconstructive Surgery

2010 Cochrane Review

ASC vs SSLS

3 RCT

- ASC
  - Lower rate of recurrent vault POP
  - Lower grade POP when recurrence
  - Shorter OR time
  - Quicker recovery
  - Less dyspareunia

- SSLS
  - Greater or equal to hymen
  - Higher or equal to hymen
  - Greater or equal to hymen
  - Greater or equal to hymen

ASC vs SSLS

- 6 months: Apex ≥ Hymen
- N=89, vault

<table>
<thead>
<tr>
<th></th>
<th>Apex</th>
<th>Anterior</th>
<th>Posterior</th>
<th>Subjective</th>
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<tbody>
<tr>
<td>ASC</td>
<td>4%</td>
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<tr>
<td>SSLS</td>
<td>19%</td>
<td>14%</td>
<td>7%</td>
<td>91%</td>
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</table>

ASC Outcomes

- Long-term outcomes for robotic & open ASC comparable
- Robotic ASC
  - maintenance of anatomic support and pelvic floor function 44 months after surgery


RCT’s Laparoscopic vs. Robotic Assisted

Paraiso M, Ob 2017,116
N=78 (R=40, L=38) vault prolapse

- Robotics Longer
  - Incision to closure [67 min (43-90 min)]
  - Anesthesia, room time, suturing

Anger JT et al.
N=78 (R=40, L=38) SCH (60%) vault
- Robotics Longer (21 mins, p<0.03)
- No difference in subjective or objective outcomes

Expert Opinions – 4 Important Tips

- Use graft rather than direct sacral affixation of the vagina, but avoid playing synthetic graft on a denuded vaginal apex
- Spread vaginal sutures over to spread out tension (anterior and posterior), rather than simple fixation at the apex
- Avoid excessive tension on the anterior vaginal graft to minimize the SUI risk
- Decrease presacral hemorrhage risk by suture placement thru anterior longitudinal ligament closer to the promontory, rather than at S3-4

Nygaard I, Obstet Gynecol 2004;104:905-23
Patient Positioning

- Arms tucked & pronated
- Hands & bony prominences protected
- Feet resting on heels in supportive stirrups
  - No pressure on popliteal fossa, lateral knee

Trendelenburg

- Remember that patient may slide towards head of bed
  - Keep towel out of视野
  - Access to presacral space
- Must use material to prevent sliding:
  - Gel mat, bean bag
  - Shoulder supports
  - Taping patient to table
- Lower extremities move closer to surgical site
  - Must be re-positioned to a "hip neutral" position

Positioning: Prevent Patient Sliding

- 2 Options
  - Shoulder Pads
Positioning: Prevent Patient Sliding

**Hug U'Vac**

Positioning: Low-rise stir-ups

Local Anesthetic

- Inject subcutaneously prior to incision
- May decrease post-op pain
- Use needle to localize accessory trocar path
Port Placement
- 5 or 10 mm umbilicus
- 10 if morcellating
- 8 mm accessory port
- Pass suture
- 2, 5 mm for sewing

Gortex® Suture for 8 mm port

Lucite Stent
Soft Polypropylene Mesh

- 2 Strips vs “Y”
- Anterior
  - Several centimeters
- Posterior
  - Rectal reflection
- NO concomitant vaginal repair

Below Promontory

- Most Prominent Structure
  - 73% - Intervertebral disc
  - 27% - Superior aspect of S1

Pre-sacral Dissection
Posterior Dissection

Sewing Mesh on Vagina

Fixing Mesh on Sacrum
Pre-sacral Suturing

Lessons learned ......

- Patient positioning EVERYTHING!
  - Maximum Trendelenberg
  - tug U Mac
- Low profile Allen stir-ups
- Minimal mesh (dose effect)
- Fixation of mesh
  - 2 separate pieces
  - Posterior first
- Don't over-correct anterior wall - "loose"
- Suture just below promontory

Thank you for your attention!
Pelvic organ prolapse (POP) will occur in over 11% of women who are post-hysterectomy and there is a lifetime risk of 19% in the general female population for undergoing a surgical procedure for POP. There are numerous proven surgical options for women with POP including trans-vaginal repair with or without mesh interposition, and mesh sacrocolpopexy (MSC) using either an open or a laparoscopic approach. Open MSC is considered the gold standard surgical technique for correction of POP with long term success rates approaching 78-100%. The main drawback of open MSC when compared with a trans-vaginal repair is peri-operative morbidity secondary to the large incision necessary for completion of the procedure. Laparoscopic approach has become a more attractive option especially after the advent of the da Vinci® robotic system which allows for improved ease of maneuvering and intra-corporeal suturing. Up to this point, there have been few series reported in the literature on robotic sacrocolpopexy (RMS) with mostly short follow-up. We describe our current technique and present a table summary of main published series in the literature so far.

Technique

The RMS is performed using the da Vinci® robot. This system utilizes two robotic arms, a camera arm and an optional fourth robotic arm. The bladder is drained with a 16 French foley catheter. An EEA clamp is placed in the vagina at the beginning of the procedure to aid with prolapse dissection. After gaining pneumoperitoneum and in maximum Trendelenburg position, the camera is inserted through a 12 mm port at the umbilicus, with the robotic arms inserted following a “W” shape configuration as previously described. An assistant port is placed laterally on the right side, for a total of 5 ports. Docking the robot was done initially at the foot of the bed, however more recently we have evolved to docking from the side in order to maintain access to the vagina. Any abdominal adhesions are taken down as necessary to free the pelvic cavity. At this point small intestines, omentum and left colon are retracted into the upper abdomen, sometimes aided by the Endo Paddle® (a laparoscopic retracting device). Once the pelvis is fully exposed, the trajectory of the right ureter is identified as well as the area of the promontory. Next,
the peritoneum is opened at the back wall of the vaginal cuff transversely in order to gain access to the recto-vaginal space. Then, the dissection is continued anteriorly between the vaginal cuff and the base of the bladder when an anterior compartment prolapse is involved. The anterior dissection is carried distally to above the level of the trigone (3-5 cm distal to the vaginal apex). Posteriorly, the dissection is carried down as distally as possible. The peritoneum over the vaginal cuff is left intact whenever possible to diminish the risk of vaginotomy and of secondary erosion by thinning out the vaginal wall in that area. The peritoneum is then incised from the bottom of the enterocele sac to the sacral promontory on the right side of the rectosigmoid. At this point, the anterior vertebral ligament is exposed. Next, on the back table the anterior and posterior components of the mesh are sutured together in a Y-shape fashion and are measured, trimmed and secured with 2-0 polyglactin sutures at each extremity. The prepared mesh is introduced into the abdomen through the assistant port. The mesh is secured as distally as possible over the posterior vaginal wall with the preplaced absorbable sutures. Additional sutures are placed more proximally and bilaterally over the posterior vaginal wall near the vaginal apex. Because these sutures are absorbable, there is no concern about possibly transfixing the vagina and obtaining a strong vaginal purchase. The anterior portion of the mesh is then secured to the anterior vaginal wall in a similar fashion. Once secured to the vagina, the mesh is then laid in its prepared peritoneal groove extending up to the anterior vertebral ligament. The mesh is secured to the anterior vertebral ligament using two, 2-0 Ethibond® non-absorbable, sutures. The mesh is positioned to follow the concavity of the sacrum, under no tension to ensure vaginal cuff support in a normal anatomic configuration. The peritoneum is then closed over the mesh using running 2-0 polyglactin sutures. A pack is placed in the vagina for 24 hours. After IV injection of indigo carmine, cystoscopy is performed to confirm no bladder or ureteral injury.
Table: Review of published robotic sacrocolpopexy series (2006-2012)

<table>
<thead>
<tr>
<th>Authors</th>
<th>N</th>
<th>Type of Mesh</th>
<th>Type of suture for vaginal mesh anchoring</th>
<th>Anatomic results</th>
<th>mesh erosion</th>
<th>Re-operation for POP</th>
<th>Follow up (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moreno Sierra, et al</td>
<td>31</td>
<td>polypropylene</td>
<td>Non-absorbable</td>
<td>0% recurrent apical prolapse</td>
<td>NR</td>
<td>None</td>
<td>24.5</td>
</tr>
<tr>
<td>Tan-Kim, et al (2011)</td>
<td>43</td>
<td>Gynemesh®</td>
<td>2-0 polypropylene</td>
<td>0% recurrent apical prolapse</td>
<td>5%</td>
<td>NR</td>
<td>6</td>
</tr>
<tr>
<td>Akl, et al (2009)</td>
<td>80</td>
<td>polypropylene</td>
<td>2-0 prolene</td>
<td>1.25% recurrent apical prolapse</td>
<td>6%</td>
<td>2 rectocele/cystocele repairs, 1 revision of MSC</td>
<td>4.8</td>
</tr>
<tr>
<td>Kramer, et al (2009)</td>
<td>21</td>
<td>polypropylene (AMS)</td>
<td>2-0 polyglactin</td>
<td>5% recurrent apical prolapse, 57% recurrent vaginal wall prolapse</td>
<td>0%</td>
<td>12 secondary cystocele or rectocele repairs</td>
<td>25.2</td>
</tr>
<tr>
<td>Daneshgari, et al (2007)</td>
<td>12</td>
<td>polypropylene</td>
<td>permanent (unspecified)</td>
<td>0% apical prolapse reported</td>
<td>NR</td>
<td>NR</td>
<td>3.1</td>
</tr>
<tr>
<td>Elliott, et al (2006)</td>
<td>21</td>
<td>Intepro®</td>
<td>1-0 polytetrafluoroethylene</td>
<td>5% recurrent apical prolapse</td>
<td>9.5%</td>
<td>1 transabdominal MSC</td>
<td>24</td>
</tr>
</tbody>
</table>

NR=not reported
References


Assessment of Outcomes of Prolapse Repairs

Sandip Vasavada, MD
Cleveland Clinic Glickman Urological Institute
Cleveland, Ohio

Outcomes Assessment

• What is best measure?
  – Symptoms
  – Bulge
  – Anatomic measurement (i.e. Baden-Walker or POP-Q)
  – Satisfaction
  – Physician assessment

Epidemiology of POP

Nearly half would not meet NIH definition for “optimal” or “satisfactory” anatomic outcome
Defining success

- Some degree of loss of anatomic support is normal
- Perfect anatomic support is associated w/ worse HRQOL (PFIQ 10pts worse for Stage 0 than Stage 1 or greater)
- Symptomatic cure is more clinically relevant than anatomic cure
- Definitions of anatomic success commonly used are too strict and often not clinically relevant

What is a failure after Prolapse surgery?

- Reoperation or retreatment?
- Complications?
- Recurrence of symptoms?
- Anatomic recurrence
  - Stage 2+?
  - Beyond hymen?
  - Stage 3+?

Anterior colporrhaphy: A randomized trial of three surgical techniques

- Aron M. Weiss, MD, Mark D. Valvira, MD, Mark R. Pleshawer, MA, and Lewis A. Ballant, MD: Cleveland, Ohio
- RCT, n = 114, May 1996 – 2000
- Cure: POPQ Aa & Ba ≤ -2
- % Cure at last follow-up
  - Standard: 30%
  - Standard + Polyglyactin 910 mesh: 42% NS
  - "Ultralateral" anterior colporrhaphy: 46%
- Mean follow-up: 23.3 months (4.5 to 43 months)

Courtesy of Matt Barber
Randomized Trial of 3 methods of Anterior Repair

Cure = Aa & Ba < -2

Weber et al, AJOG 2001

Definition of Cure

- 2001 NIH Workshop on Standardization:
  - “Optimal” anatomic outcome – Stage 0
  - “Satisfactory” anatomic outcome – Stage 1

- NIH definitions too strict
  - over 75% of women presenting for annual exams would not meet “optimal” definition and 40% would not meet the “satisfactory” anatomic outcome definition.

Swift et al, AJOG 2000
Swift et al, AJOG 2005
Trowbridge et al, AJOG 2008

Definition of Cure

- The hymen is an important threshold for symptom development.
- The pelvic symptom that best correlates with advanced prolapse is a vaginal bulge that can be seen or felt.
- The absence of vaginal bulge symptoms postoperatively has a significant relationship with a patients assessment of treatment success and HRQOL while anatomic success alone does not.

Swift et al, AJOG 2000
Tan et al, 2005
Bradley et al, 2005
Barber et al, 2010
NIH Pelvic Floor Disorders Network Recommendation

Success after POP surgery:
– No prolapse beyond the hymen
  (Aa, Ba, C, Ap, Bp < 0)
– No vaginal bulge symptoms and
– No retreatment

Barber et al, Obstet Gynecol 2010

Objective

Reanalyze the results of the trial by Weber et al comparing three techniques for surgical correction of anterior vaginal prolapse using more clinically relevant definitions anatomic and symptomatic prolapse recurrence.

Methods

• Re-analysis of trial by Weber et al
• 114 subjects undergoing surgery for anterior vaginal prolapse randomized (1:1:1) to one of three techniques
• Exclusions: any planned incontinence procedure other than suburethral plication.
• Pre- and Post-operative data abstracted from original case report forms.
• Follow-up at 6, 12, 24 months:
  – POPQ exam by blinded examiner
  – Symptom questionnaires (VAS)
Methods

- Prolapse VAS: “How much are you bothered by symptoms related to vaginal prolapse” (0 “not at all” – 100 “extremely”)
- Treatment success:
  - POPQ Ba, Bp, C ≤ 0 cm
  - Absence of prolapse symptoms (VAS < 20)
  - No retreatment

Randomized (n = 114)

<table>
<thead>
<tr>
<th>Allocation</th>
<th>Standard Anterior Colporrhaphy (n = 38)</th>
<th>Ultralateral Anterior Colporrhaphy (n = 38)</th>
<th>Standard plus Polyglactin 910 Mesh (n = 38)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow-up</td>
<td>Last to follow up (n = 1)</td>
<td>Last to follow up (n = 2)</td>
<td>Last to follow up (n = 7)</td>
</tr>
<tr>
<td>Analysis</td>
<td>Analyzed (n = 35 with any follow up, n = 32 with 1+ year data)</td>
<td>Analyzed (n = 32 with any follow up, n = 29 with 1+ year data)</td>
<td>Analyzed (n = 30 with any follow up, n = 27 with 1+ year data)</td>
</tr>
</tbody>
</table>

Mean follow-up: 23.3 months (0 to 172 months)
85% (97/114) returned for at least one follow-up

Concurrent Surgery

- TVH 53%
- Posterior colporrhaphy 94%
- Enterocele repair 26%
- Vaginal vault suspension 44%
Outcomes at one year

<table>
<thead>
<tr>
<th>Median POPQ value (range)</th>
<th>Standard</th>
<th>Ultralateral</th>
<th>Mesh</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ba (-1.5 to +1)</td>
<td>-1.3 (-3 to +4)</td>
<td>-1 (-3 to +2)</td>
<td>-1 (-3 to 4)</td>
<td></td>
</tr>
<tr>
<td>C (-6 to +1)</td>
<td>-6 (-10 to +4)</td>
<td>-6 (-7.5 to -2)</td>
<td>-6 (-10 to 4)</td>
<td></td>
</tr>
<tr>
<td>Bp (-3 to +1)</td>
<td>-3 (-3 to +1)</td>
<td>-2.5 (-3 to +4)</td>
<td>-3 (-3 to 0)</td>
<td></td>
</tr>
</tbody>
</table>

- No prolapse beyond the hymen: 25/28 (89%) 22/26 (85%) 22/23 (96%) 69/77 (90%)
- Absence of POP Symptoms: 32/32 (100%) 27/29 (93%) 21/23 (91%) 80/84 (95%)
- No reoperations for POP: 32/32 (100%) 29/29 (100%) 27/27 (100%) 88/88 (100%)
- No prolapse beyond hymen, no symptoms, no retreatment: 25/28 (89%) 21/27 (78%) 21/23 (91%) 67/78 (86%)

A Few More Considerations...

- Just because bulge is gone, does not mean all is ok
  - Incontinence
  - Defecatory dysfunction
  - Sexual dysfunction
  - Mesh complication
- Re-assess patient outcomes and goals and expectations

Conclusions

- The success rate of anterior colporrhaphy varies considerably depending upon the definition of treatment success used.
- When strict anatomic criteria are used, the success rate is low.
- When more clinically relevant criteria are used, treatment success is better with only 10% developing anatomic recurrence beyond the hymen, 5% developing symptomatic recurrence and 1% undergoing retreatment during the study follow-up.
- Patient outcomes and expectations should be reviewed