The Ins and Outs of Laparoscopic Abdominal Sacrocolpoperineopexy

W23, 30 August 2011 09:00 - 12:00

Start	End	Topic	Speakers
09:00	09:10	Introduction	• Patrick Woodman
09:10	09:30	Overview: Why Laparoscopic Abdominal Sacralcolpoperineopexy?	• Colleen McDermott
09:30	09:45	Pelvic Floor Reconstruction Graft Materials	• Douglass Hale
09:45	10:00	Suture Techniques	• Colleen McDermott
10:00	10:20	Deep Anterior and Posterior Dissection and Vaginal Graft Application	• Douglass Hale
10:20	10:30	Discussion	All
10:30	11:00	Break	None
11:00	11:20	Laparoscopic Technique: Port Placement, Mechanics & Pitfalls	• Colleen McDermott
11:20	11:35	Robotic-Assisted LASCP: Port Placement, Mechanics & Pitfalls	• Patrick Woodman
11:35	11:50	Concomitant Urinary Incontinence Surgery	• Douglass Hale
11:50	12:00	Questions	All

Aims of course/workshop

1. To review the pertinent anatomy pursuant to laparoscopic pelvic reconstructive surgery.
2. To discuss the advantages and disadvantages of laparoscopic repairs.
3. To describe the Laparoscopic Abdominal Sacralcolpoperineopexy (LASCP) technique, with and without Robotic Assistance, as well as reveal laparoscopic “pearls” to make the job easier.
4. To review the evidence-based literature about these repairs
5. To answer the question: "The uterus: does it need to come out?"
6. To discuss the addition of concomitant procedures to the LASCP.

Educational Objectives

Laparoscopic Sacral Colpoperineopexy (LASCP)offers similar excellent success rates to its open counterpart, and these minimally-invasive procedures are becoming more popular. Laparoscopic approaches offer benefits of lower blood loss, quicker short-term and long-term convalescence, better visualization and improved retraction. However, outside of a training program and/or without specialized surgical assistants, it is difficult to gain sufficient experience in advanced laparoscopic skills.

This workshop would help guide the experienced surgeon through the process of adding advanced laparoscopic reconstructive surgery skills to their armamentarium. There are several specialized and improvised devices available that can assist in laparoscopic procedures. Graft materials, port placement, instrumentation, technique, and "pearls" on how to assist oneself will also be discussed. Finally, the evidence-based medical literature will also be reviewed.

The Ins and Outs of Laparoscopic Abdominal Sacrocolpoperineopexy

ICS Annual Scientific Meeting 2011
Glasgow, Scotland

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INDIANA UNIVERSITY

Disclosures

- Patrick J. Woodman, DO, MS; FACS, FACOOG
  - Speakers' Bureau, Pfizer Pharmaceuticals
  - Unrestricted Educational Research Grant, Ethicon Women's Health & Urology
- Colleen McDermott, MD, MS; FRCOG
- Douglass S. Hale, MD; FACOG
  - Consultant, Ethicon Women's Health & Urology
  - Research Support, Urogynecology Advisory Board, Allergan Pharmaceuticals

Educational Objectives

- To review the pertinent anatomy pursuant to laparoscopic pelvic reconstructive surgery
- To discuss the advantages & disadvantages of laparoscopic repairs
- To describe the LASCP technique, with & without Robotic assistance and "pearls"
- Review the evidence-based literature
- Does the uterus need to come out?
- To discuss the addition of concomitant procedures to LASCP

Workshop #23 Schedule:

The Ins and Outs of Laparoscopic Abdominal Sacrocolpoperineopexy

Time	Title	Lecturer
09:00-09:10	Introduction	Woodman
09:10-09:3	Overview: Why LASCP-P?	McDermott
09:30-09:45	Pelvic Floor Recnstr Graft Materials	Hale
09:45-10:00	Suture Techniques	McDermott
10:00-10:20	Deep Dissection & Vaginal Graft Appln	Hale
10:20-10:30	Discussion	Panel
10:30-11:00	*** Break ***	
11:00-11:20	Laparoscopic Technique	McDermott
11:20-11:35	Robotic-Assisted LASCP Technique	Woodman
11:35-11:50	Concomitant Incontinence Surgery	Hale
11:50-12:00	Questions?	Panel

Housekeeping

- Restrooms
- Break 10:30-11:00
- Syllabus / Handouts
- Evaluations

Why Laparoscopic Sacral Colpoperineopexy?

Colleen D. McDermott MSc, MD, FRCSC
August 30th, 2011

OBJECTIVES

- Procedure Evolution
- What's the Evidence?
- Advantages/Disadvantages

Procedure Evolution

- POP: prevalent condition, 11.1% lifetime risk of requiring surgical correction by the age of 80[1]
- Key to surgical correction: **FIX THE APEX!**
- **Sacral Colpopexy**:
  - Gold standard for correction of all three vaginal compartments[2-4]
  - Re-suspends the vaginal apex to the anterior longitudinal ligament overlying the sacrum using graft material

[1]Olsen AL, et al. *Obstet Gynecol*. 1997; 89: 501-6.
[2]Maher C, et al. *Cochrane Database Syst Rev*. 2007; 3: CD004014.
[3]Addison W, et al. *J Gynecol Tech*. 1996; 37: 69-74.
[4]Brubaker L. *Am J Obstet Gynecol*. 1995; 173: 1690-5.

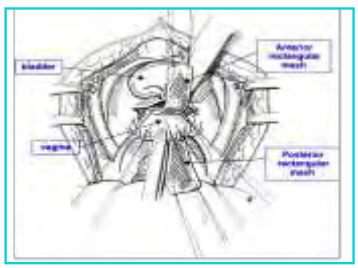
Procedure Evolution

- **1957 Arthure & Savage**: anchored posterior uterine fundus to the anterior longitudinal ligament[1]
- **1958 Huguier & Scali; 1962 Lane**: addition of graft material between the vagina and sacral promontory[2-3]
- **1970's Birnbaum**: proximal placement of graft at S3 to S4 to recreate the natural vaginal plane[4]
- **1970's Sutton**: proximal end of the graft be attached at the S1 to S2 vertebral level to see the middle sacral vessels[5]

[1]Arthure HG, Savage D. *J Obstet Gynaecol Br Emp*. 1957; 64: 355-60.
[2]Huguier J, Scali P. *Presse Med*. 1958; 66: 781-4.
[3]Lane FE. *Obstet Gynecol*. 1962; 20: 72-7.
[4]Birnbaum SJ. *Am J Obstet Gynecol*. 1973; 115: 411-9.
[5]Sutton GP, et al. *Am J Obstet Gynecol*. 1981; 140: 836-7.

Procedure Evolution

- **Graft Configurations: single piece → cone → Y-mesh → 2-strap**



Costantini E, et al. *Eur Urol*. 2005; 48: 642-9.

Procedure Evolution

- **Biologic Grafts**
  - autologous, allograft, xenograft
  - Advantage: reduced erosion rates
  - Disadvantage: reduced longevity
- **Synthetic Grafts**
  - Advantage: durability
  - Disadvantage: increased erosion rates
  - type I polypropylene mesh: excellent anatomic cure rates, few complications [1-2]

[1]Iglesia CB, et al. *Int Urogynecol J Pelvic Floor Dysfunct*. 1997; 8: 105-15.
[2]Ridgeway B, et al. *Clin Obstet Gynecol*. 2008; 51: 136-52.

Procedure Evolution

- **1997**: posterior graft extension to perineum → **Sacral Colpoperineopexy (SCP)**[1]
- recreate entire length of rectovaginal septum → correct posterior wall defects and perineal descent

[1]Cundiff GW, et al. *Am J Obstet Gynecol.* 1997;177:1345-53.
Figure: Walters and Karram, Urogynecology and Reconstructive Pelvic Surgery, 2nd ed.

Procedure Evolution

- **SCP**

1. Abdominal-vaginal approach starting at vagina
   - open posterior vaginal wall, dissect laterally to levator ani muscles, dissect superiorly to enterocele sac
   - anchor graft laterally to pelvic sidewall into the fascia overlying the levator ani muscles and distally to the perineal body
   - enter peritoneal cavity and place proximal portion of graft into cavity
   - perineorrhaphy
   - abdominal portion of case

Procedure Evolution

- **SCP**

2. Abdominal-vaginal approach starting abdominally
   - posterior graft placed at the level of the perineal body during the abdominal portion of the case
   - at the end of the case, a perineorrhaphy is performed and the distal portion of the graft is attached to the perineal body

Procedure Evolution

- **SCP**

Abdominal-vaginal approaches (1 & 2):

- narrow the vaginal introitus
- rebuild the perineal body
- require copious pelvic irrigation with antibiotic solution after sacral graft attachment

Procedure Evolution

- **SCP**

3. Abdominal approach
   - attachment to perineal body done solely through an abdominal approach
   - commonly done when a perineorrhaphy is not required
   - strong distal fixation is more difficult to attain

Procedure Evolution

- open laparotomy, traditional laparoscopy, robotic-assisted laparoscopy
- Dorsey and Cundiff 1994[1] → LSC
  - improve pelvic visualization
  - reduce operative morbidity
  - improve post-operative function
- Di Marco et al. 2004[2] → Robotic LSC
  - shorten learning curve associated with LSC
  - simplify execution of laparoscopic maneuvers

[1]Dorsey JH, Cundiff G. *Curr Opin Obstet Gynecol.* 1994;6(3):223-230.
[2]Di Marco Dset al. *Urology.* 2004;63(2):373-376.

Procedure Evolution

- Approach Selection
  - level of comfort and expertise
  - need for concomitant procedures
  - patient factors → age, BMI, previous surgery, co-morbidities that limit anesthesia time

What's the Evidence?

- LSC
  - observational studies only
  - no clinical trials
  - no systematic reviews
  - Ross et al[1] → 51 patients, 5 years post-op
    - 93% objective cure rate
    - 3 patients had recurrent vault prolapse

[1]Ross JW, Preston M. *J Minim Invasive Gynecol.* 2005;12(3):221-226.

What's the Evidence?

- LSC
  - Higgs et al[1] → 103 patients, mean follow-up
    - 92% had successful vault support
    - 35% had non-vault prolapse recurrence
    - 79% subjectively cured or improved
  - Claerhout et al[2] → 132 patients, 12.5 months post-op
    - 2% vault recurrence
    - 3% anterior wall recurrence
    - 18% posterior wall recurrence
    - 92% subjective cure rate

[1]Higgs PJ, et al. *BJOG.* Aug 2005;112(8):1134-1138.
[2]Claerhout F, et al. *European Urology.* 2009;55:1459-1468.

What's the Evidence?

- Bladder Function after LSC
  - 86% improvement or no change[1]
  - 2.8% post-operative stress urinary incontinence, 18% de novo or persistent urge urinary incontinence[2]
  - 5 to 7% de novo urinary symptoms[3]

[1]Higgs PJ, et al. *BJOG.* Aug 2005;112(8):1134-1138.
[2]Agarwala N, et al. *J Minim Invasive Gynecol.* 2007;14(5):577-583.
[3]Claerhout F, et al. *European Urology.* 2009;55:1459-1468.

What's the Evidence?

- Bowel Function after LSC
  - 17% persistent obstructed defecation [1]
  - >50% persistent constipation and 5% with de novo constipation [2]
- Sexual Function after LSC
  - 9-23% de novo dyspareunia[1,2]
  - ~50% with pre-operative dyspareunia improve after LSC[1,2]

[1]Ross JW, Preston M. *J Minim Invasive Gynecol.* 2005;12(3):221-226.
[2]Claerhout F, et al. *European Urology.* 2009;55:1459-1468.

What's the Evidence?

- LSC Complications[1]
  - 402 cases of LSC → no significant difference in intra- or peri-operative complications
  - overall complication rates
    - 0.75% for hematoma
    - 2.2% for ileus or small bowel obstruction
    - 1.5% for bladder injury
    - 0.75% for bowel injury
    - 0.25% for ureteric injury
    - 1.2% mesh erosion rate

[1]Stepanian AA, *J Minim Invasive Gynecol.* 2008;15(2):188-196.

What's the Evidence?

- LSCP
  - McDermott et al[1] → 51 A-LSCP patients and 17 AV-LSCP patients, 1 year post-op
  - no differences in POP-Q measurements
  - A-LSCP group had fewer mesh erosions and a lower rate of dyspareunia
  - AV-LSCP group had fewer recurrent symptoms of prolapse
  - both groups had similar rates of surgical satisfaction

[1]McDermott CD, et al. *Int Urogynecol J Pelvic Floor Dysfunct.* 2011; 22(4):469-475.

What's the Evidence?

- **LSC versus ASC**
  - **3 studies**
  - **all showed LSC has longer OR time, less blood loss, and shorter hospital stay**

What's the Evidence?

- **LSC versus ASC**
  - Paraiso et al[1] → 56 LSC patients versus 61 ASC patients; similar complication and re-operation rates
  - Hsiao et al[2] → 25 LSC patients versus 22 ASC patients
    - apical recurrence: LSC=0; ASC=1
    - anterior recurrence: LSC=2; ASC=4
    - posterior recurrrence: LSC=1; ASC=3
    - no polypropylene mesh erosion
    - critical point in the learning curve for LSC was 10cases
  - Klauschie et al[3] → 44 LSC patients versus 41 ASC patients
    - similar intra- and peri-op complication rates
    - no apical failures
    - point C significantly higher in ASC group at 6 weeks and 6 months post-op, but this difference was gone by 1 year post-op
    - anterior recurrence: LSC=3; ASC=5
    - posterior recurrence: LSC=3; ASC=6

[1]Paraiso MFet al. *Am J Obstet Gynecol.* May 2005;192(5):1752-1758.
[2]Hsiao KC, et al. *J Endourol.* Aug 2007;21(8):926-930.
[3]Klauschie JL, et al. *Int Urogynecol J Pelvic Floor Dysfunct. Mar* 2009;20(3):273-279.

What's the Evidence?

- **LSCP versus ASCP**
  - Su et al[1] → 20 LSCP (11 robotic) versus 29 ASCP
    - both groups had significant improvement in QoL scores and POP-Q measurements at 6 months post-op
    - both groups had significant improvement in perineal descent, as shown by the 2 cm post-op reduction in the GH + PB length.
    - anterior recurrence: LSCP=2, ASCP=2
    - posterior recurrence: LSCP=0; ASCP=3
    - apical recurrence: LSCP=0; ASCP=0
    - 2 LSCP patients an 0 ASCP patients had mesh erosions
    - 4 LSCP patients and 1 ASCP patient had suture erosions

[1]Su KC, et al. *Journal of Pelvic Medicine and Surgery.* 2007;14(4):181-190.

What's the Evidence?

- **Robotic LSC**
  - case series and cohort studies
  - Elliott et al[1] → 21 patients, 1 year post-op
    - 95% apical cure rate [51].
    - 100% surgical satisfaction rate
  - Akl et al[2] → 80 patients, ? post-op
    - recurrent prolapse rate of 3.7% (one apical, one anterior, and one posterior) [53].

[1]Elliott DS, et al. *J Urol.* Aug 2006;176(2):655-659.
[2]Akl M, et al. *Surg Endosc.* 2009; 23(10):2390-4.

What's the Evidence?

- **Robotic LSC**
  - Moreno Sierra et al[1] → 31 patients, 2 years post-op
    - no recurrences
  - Shariati et al[2] → 77 patients, 1 year after robotic LSCP[54]
    - one patient with stage II recurrence
    - 94% surgical satisfaction rate after 1 year of follow-up

[1]Moreno Sierra J, et al. *Urol Int.* 2011; Feb Epub ahead of print.
[2]Shariati A, et al. *Journal of Pelvic Medicine and Surgery.* 2008;14(3):163-171.

What's the Evidence?

- **Bladder Function after Robotic LSC**
  - not well investigated
  - 9.5% post-op urinary incontinence (de novo/type not specified)[1]
  - urodynamic parameters not significantly changed by this procedure[2]
  - 1% persistent overactive bladder symptoms, 19.5% de novo urge incontinence[3]
- No studies on bowel or sexual function

[1]Elliott DS, et al. *J Urol.* Aug 2006;176(2):655-659.
[2]Kramer BA, et al. *J Endourol.* Apr 2009;23(4):655-658.
[3]Shariati A, et al. *Journal of Pelvic Medicine and Surgery.* 2008;14(3):163-171

What's the Evidence?

- **Robotic Complications**
  - Akl et al[1] → robotic LSC complication rates
    - 1.2% cystotomy
    - 1.2% enterotomy
    - 1.2% ureteric injury
    - 1.2% post-operative ileus
    - 6% mesh erosion [53].
  - Shariati et al[2] → robotic LSCP complication rates
    - 5.2% cystotomy
    - 1.3% proctotomy
    - 6.5% post-operative ileus
    - 9.1% suture and/or mesh erosion rate [54].

[1]Akl M, et al. *Surg Endosc.* 2009; 23(10):2390-4.
[2]Shariati A, et al. *Journal of Pelvic Medicine and Surgery.* 2008;14(3):163-171.

What's the Evidence?

- **Robotic LSC versus ASC**
  - Geller et al[1] → 73 robotic LSC patients and 105 ASC patients, 6 weeks post-op
    - robotic group had significantly higher POP-Q point C values (-9cm versus -8cm), other anatomic measures were similar
    - robotic group had longer OR time, less blood loss, and shorter hospital stay
    - no significant differences for intra- and post-operative complications

[1]Geller EJ, et al. *Obstet Gynecol.* Dec 2008;112(6):1201-1206.

What's the Evidence?

- **Cost Differences**
  - Patel et al[1] → direct and total hospital costs between LSC, robotic LSC, ASC
    - 15 cases reviewed, 5 per group
    - OR costs: LSC and robotic LSC >>> ASC
    - other direct costs (anesthesia, hospital room, lab tests, and medications): not different
    - total charges: LSC and robotic LSC >>> ASC
      - LSC $19,308.94; RLSC $24,161.48; ASC $13,149.99
    - conclusion: RLSC has highest direct and total costs, ASC was the least expensive

[1]Patel M, et al. *Int Urogynecol J Pelvic Floor Dysfunct.* Feb 2009;20(2):223-228.

Advantages/Disadvantages

- **LSC**
  - Advantages
    - minimally invasive (less blood loss, shorter hospital stay, shorter recovery, less pain)
    - excellent visualization of pelvis and presacral space
    - comparable cure rates to ASC
  - Disadvantages
    - technically challenging, need for skilled assistant
    - operator learning curve
    - longer OR times (?)
    - cost

Advantages/Disadvantages

- **LSCP**
  - Advantages
    - better posterior outcomes (?)
    - reduced perineal descent (?)
  - Disadvantages
    - more extensive posterior dissection
    - abdominal-vaginal approach → increased risk of mesh complications (?)

[1]Su KC, et al. *Journal of Pelvic Medicine and Surgery.* 2007;13(4):181-190.

Advantages/Disadvantages

- **Robotic LSC**
  - Advantages
    - skilled surgical assist not necessary
    - improved instrument dexterity
    - minimally invasive (less blood loss, shorter hospital stay, shorter recovery, less pain)
    - excellent visualization of pelvis and presacral space
    - comparable cure rates to ASC
  - Disadvantages
    - availability
    - operator learning curve
    - no tactile feedback
    - cost

[5]Su KC, et al. *Journal of Pelvic Medicine and Surgery.* 2007;13(4):181-190.

Thank You!

Pelvic Floor Reconstruction: Graft Materials

Douglass S. Hale, M.D., FACOG, FACS
Director Female Pelvic Medicine and Reconstructive Surgery Fellowship
Indiana University Health System

Disclosures

- Relevant financial relationships exist with the following commercial interests:
  - Consultant: Women's Health and Urology
  - Funded Research: Allergan

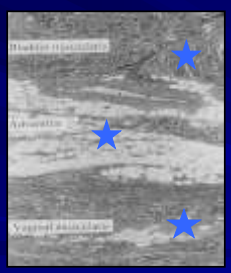
Objectives

1. Outline the different graft materials available for use in pelvic surgery.
2. Describe the characteristics of synthetic grafts.
3. Choose an appropriate mesh for use in prolapse repair.

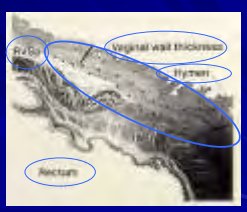
How do we reestablish support once its lost?

- Use native tissue
- Use a graft

ANTERIOR and POSTERIOR VAGINAL WALLS

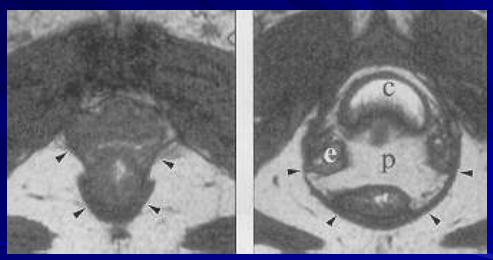


Anterior wall
Weber,1997



Posterior wall
DeLancey,1999

MRI of Levator Ani



Rest Ballooning

Hernia

- RCT – Primary or First Repeat Incisional Hernia Repair (Suture vs. mesh), N=200, F/U 3yrs
- Recurrence Rates
  - **Primary: Suture 43% vs. Mesh 24%**
  - **First Repeat: Suture 58% vs. Mesh 20%**
  - NEJM 343(6):392-8.2000, Aug 10.

Open Mesh vs. Non-Mesh for Groin Hernia Repair

- Cochrane Database of Systematic Reviews
  2001, Issue 3, Art. No.:002197.
  - 20 studies
  - Most frequent operation in general surgery
    - 700,000 in US in 1993.
  - **Reduction in recurrence between 50-75%**
  - **Some evidence of quicker return to work and lower rates of persisting pain**

Surgical *Route* for Prolapse *or* ***Graft vs. Native Tissue***

- Prospective, randomized study n=80
  - Follow up = 2.5 years (1-5.5)
  - Reoperation rate 33% for vaginal, 16% for abdominal
  - 2 x the success rate with abdominal surgery for prolapse
    (Benson, *Am J Obstet Gynecol*, 1996)
- Retrospective n=117 / f/u = 101pts
  - Follow up approximately 2 years for each group
  - Recurrent prolapse = 33% vaginal / 19% abdominal
    (Sze, *Int Urogynecol J Pelvic Floor Dysfunct*, 1999)
- Lo and Wang (1998) – sacral colpopexy superior
- Maher (2004) –prospective, randomized, n=95
  - "Both highly effective"
  - Apex failure was 17% in sacrospinous vs. 4% in sacral colpopexy (to intoitus)

Difference is graft vs. native tissue repair

GRAFT MATERIALS

- Synthetics
  - Absorbable / permanent
- Autografts
  - Rectus / fascia lata / patellar
- Allografts – homograft (same species)
  - Fascia lata / Duramater / pericardium / patellar / etc.
- Xenografts – heterograft (different species)
  - SIS = small intestine submucosa
  - Porcine Dermis
  - Bovine pericardium

Amid Classification of Surgical Meshes

- Type I – monofilament, macroporous (>75µm)
- Type II – microporous (<10µm)
- Type III – macroporous with either multifilaments or microporous elements
- Type IV – biomaterials with submicronic pores

Amid, *Hernia* 1997.

Synthetic Meshes

- Multifilament
  - Polyester
  - Polypropylene
- Monofilament
  - Polypropylene

- Mersilene (Ethicon)
- Surgipro / IVS/ Ob-tape
- Atrium (Atrium Medical)
- Marlex / (CR Bard)
- Prolene/Gynemesh (Ethicon)
- Polyform (Boston Scientific)
- Intepro (American Medical Systems)
- Dolphin (Futura)
- VitaMesh (Proxy Biomed)
- At least 10 others

Synthetic Meshes

- Expanded PTFE
- PTFE
  - Goretex (WL Gore)
  - Teflon (CR Bard)
- Monofilament
  - Polypropylene Plus
    - ULTRAPRO* (Poliglecaprone-25 / Polypropylene)
    - Proceed – PP + polydiaxanone + oxidized regenerated cellulose (Ethicon)
    - Pelvitex – PP + porcine collagen (CR Bard)
    - Prolift +M = Polypropylene + Monocryl

SYNTHETIC MESHES

- American National Standards Institute (ANS)
- American Society for Testing and Materials Standards (ASTM)
- International Organization for Standardization (ISO)
  - International classification for standards (ICS)
  - Technical Committee (TC)

SYNTHETIC MESHES

- Structure
- Thickness
- Flexural rigidity
- Tensile and bursting strength
- Pore size
- Surface texture
- Monofilament vs. multifilament
- Absorbable vs non-absorbable
- See through quality

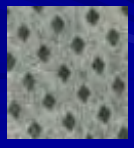
Synthetic Mesh Structures

·Knitted Monofilament

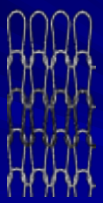
·Woven Multifilament

·Knitted Multifilament

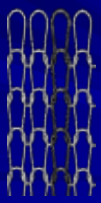
·Non Knitted Non Woven



Course: Row of loops or stitches running across the knit fabric



Wale: Vertical chain of loops in the lengthwise direction of the fabric, formed by one needle



Scanning Electron Micrographs Polypropylene Mesh X-Sections

Prolene	Marlex	Atrium
0.065 cm	0.066 cm	0.048 cm

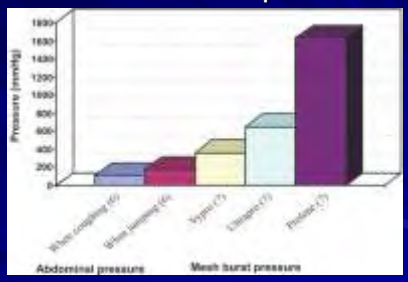
100X

Intra-abdominal Pressure

- Coughing and Jumping generate maximal intra-abdominal pressure
  - 170mmHg (tensile strength of 32N/cm)
  - Meshes generally over engineered
    - Vipro = 360mmHg

Brown, Ann R Coll Surg Engl 2010; ***92: 272–278***

Comparison of mesh strength with abdominal wall pressures



Brown, Ann R Coll Surg Engl 2010; ***92: 272–278***

Mesh Weights

- Heavy weight meshes
  - 100 g/m^2 (1.5 g for 10 × 15 cm mesh)
- Moderate weight meshes
  - 50 g/m^2 (0.75 g for 10 x 15 cm mesh)
- Light weight meshes
  - 33 g/m^2 (0.5 g for 10 × 15 cm mesh)

Brown, Ann R Coll Surg Engl 2010; ***92: 272–278***


Brown, Ann R Coll Surg Engl 2010; 92: 272–278

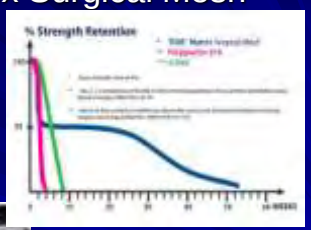
Smartmesh™

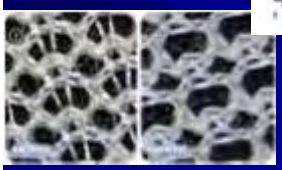
- 19gm/m2
- 1.8mm pores
  - Patented 100 micron interstitial Smartpores™
- promotes stronger new collagen formation and more mature collagen than heavy meshes

TIGR Matrix Surgical Mesh

- 100 percent resorbable, synthetic matrix, knitted from two different resorbable fibers that degrade at different rates following implantation.
- The first fiber is a copolymer of glycolide, lactide and trimethylene carbonate. The second fiber is a copolymer of lactide and trimethylene carbonate. Both fibers degrade by bulk hydrolysis once implanted.

TIGR Matrix Surgical Mesh





Pore Size

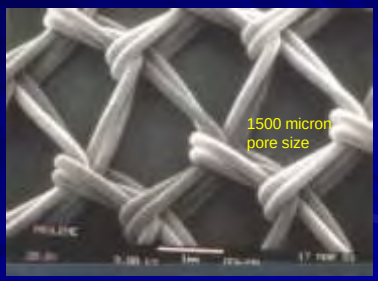
Interstices

Mono vs. Multifilament

SIZES

- BACTERIA – 0.5 – 5.0 µm
- PMN's / MACROPHAGES – 10-50 µm
- RBC – 9 µm
- FIBROBLAST – 15 x 50 µm
- SYNTHETIC MESH PORE SIZE – 10-1000 µm range
  - Now with some composite meshes, may reach >4000 µm

Scanning Electron Micrograph
PROLENE Polypropylene Mesh

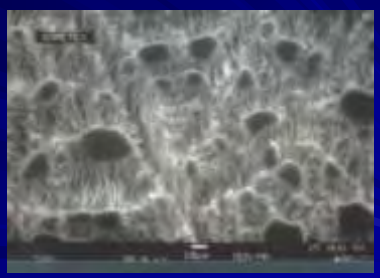


20X

Scanning Electron Micrograph
Gore-Tex Tissue Patch

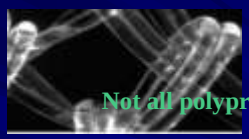
20X

Scanning Electron Micrograph
Gore-Tex Tissue Patch

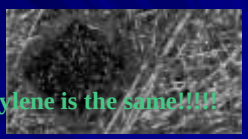


500X

Monarc sling, AMS



Ob Tape, Mentor

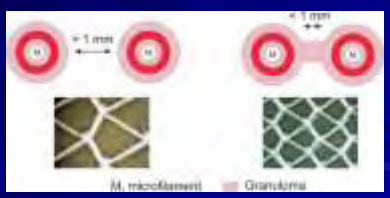


Not all polypropylene is the same!!!!

TYCO IVS

Bridging

This leads to a
stiff scar plate and reduced flexibility. It occurs in meshes with small pores of less than 800 µm.



Brown, Ann R Coll Surg Engl 2010; ***92: 272–278***

Stress shielding

Stress shielding?

Tobacco use is a risk factor for mesh erosion after abdominal sacral colpoperineopexy

- Case control study
  - 27 cases of mesh erosion
  - 81 matched controls
- OR of erosion 4.4 (1.3-14.4)

Lowman, Am J Obstet Gynecol 2008;198:561.e1-561.e4.

Risk factors for mesh/suture erosion following sacral colpopexy

- PFDN 322 patients in CARE study at 2 years – 20 (6%) had a mesh or suture erosion
- Increased odds ratios of erosion with
  - ePTFE - 4.2
  - Concurrent hysterectomy - 4.9
  - Smoking - 5.2

Cundiff, Am J Obstet Gynecol 2008;199:688.e1-688.e5.

Biograft Data

Randomized Trial of 3 Surgical Techniques

- 106 women = stage II or greater
  - 37 traditional posterior colporrhaphy
  - 37 site specific
  - 32 site specific with Fortagen™ – sis collagen
- At 1 year – failure as stg II and hymen:
  - 3/33(9%) 1/33(3%) post colp
  - 5/37 (13.5%) 2/35(5%) site specific
  - 9/27(33%) 4/29(14%) graft+site specific

Paraiso,AJOG(2006)195,1762-71.

Tutoplast™ Sacral Colpopexy

- 100 patients randomized
  - 46 biograft, 54 mesh
  - 1 year follow-up
    - 9%(4/45) mesh and 32%(14/44) biograft = failed
    - 15/18 point Aa = -1
    - 3/18 point Ap = -1
    - No point C failures

Culligan, Obstet Gynecol,2005,106,29-37.

GRAFT CONCLUSIONS

- The ideal graft has not been developed
- Resistance to infection, minimal foreign body reaction, biocompatibility, pliability, strength, and molecular permeability are ideal properties
- For synthetics, Type I polypropylene meshes appear to be the best

Future

- Mesh design
  - Lighter weight, large pore meshes induce less scar tissue formation, less retraction
  - Need to develop mesh with ease of handling
- Decrease complications
  - Erosions
  - Foreign body reactions, scar tissue formation
- New materials
  - Even better interaction with host

Laparoscopic Technique: Port Placement, Mechanics, and Pitfalls

Dr. Colleen D. McDermott MD, FRCSC
August 30th, 2011

Objectives

- Patient and Room Setup
- Abdominal Entry
- Pneumoperitoneum
- Port Placement for LSCP
- Port Closure
- Port Pitfalls
- The Future: Single Port?

Patient & Room Setup

- 24 hours before surgery → clear fluid diet, bowel prep (osmotic + stimulant laxative), potassium supplement
- morning of surgery → +/- fleet enema, prophylactic antibiotics and Heparin, inflatable sequential compression devices on lower extremities

Patient & Room Setup

- In OR →
  - dorsal supine lithotomy
  - legs in adjustable Allen stirrups
  - bed broken below hips for vaginal access
  - Check legs to ensure they can be positioned where the hip joints are neutral

Patient & Room Setup

- In OR →
  - arms tucked in at both sides with extra padding (consider use of extra shoulder padding to prevent slipping while in steep trendelenberg)

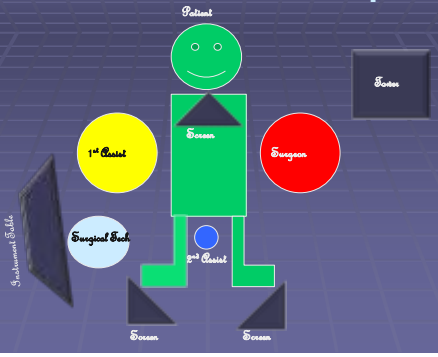
Patient & Room Setup

- prepared abdominally and vaginally
- double drape technique
- Video

Patient & Room Setup

- vaginal portion completed and top drape removed
- surgeons remove their gown and gloves and re-gown and re-glove

Patient & Room Setup



Abdominal Entry

- three options
  - open entry → Hassan technique
  - closed entry → Veress needle
  - optical port
- generally in the infraumbilical region
- primary camera point in line with the vagina and approaches it at 45° angle

Abdominal Entry

- open entry/Hassan technique
  - favoured by general surgeons and urologists
  - sharp and blunt dissection through incision
  - fascia incised
  - muscle layers split
  - peritoneum incised
  - fascial stay sutures
  - Hassan blunt tip cannula is introduced and secured
  - no evidence to support that this is superior to any other abdominal entry technique[1]

1. Tulandi SCI et al. JOGC 2007; 29:433-447

Abdominal Entry

- Veress needle
  - blind insertion
  - tactile feedback as it passes through the layers of the abdominal wall
  - consider use of Palmers point (3cm below the subcostal border at the midclavicular line) in patients with intra-abdominal adhesions, an umbilical hernia, or after 3 failed attempts at the umbilicus

Abdominal Entry

- Veress needle[1]
  - safety checks not useful in confirming placement of needle
  - entry pressure of <10mmHg is a reliable indicator of correct placement (insert with gas attached and running)
  - elevation of the anterior abdominal wall is not recommended
  - angle of the needle should vary according to patient BMI → 45° for non-obese and 90° for obese

1. Tulandi SCI et al. JOGC 2007; 29:433-447

Abdominal Entry

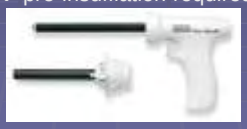
- optical trocar[1]
  - hollow, with a 0° scope loaded to transmit real time images while transecting the abdominal wall layers
  - requires significant axial thrusts, anterior abdominal wall lifted
  - minimizes the size of entry wound
  - visceral and vascular injuries can still occur

1. Tulsa SK et al. JSLS 2007; 11:433-447

Abdominal Entry

- optical trocar
  - Endopath Optiview → no pre-insufflation required

  - Visiport → pre-insufflation required



Pneumoperitoneum

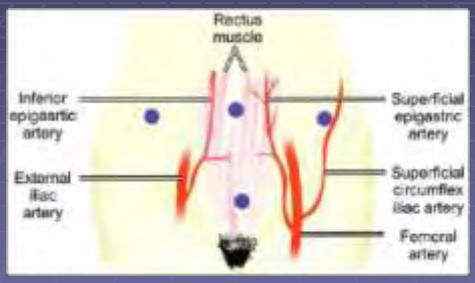
- insufflated with CO_2 gas
- high pressure entry technique recommended for secondary trocar insertion[1]
  - increase intra-abdominal pressure: 20 to 30mmHg
  - produces greater splinting of the anterior abdominal wall and a deeper intra-abdominal CO_2 bubble
  - entry is easier for the surgeon and safer for the patient
  - no clinically significant changes in hemodynamic status
- following port placement, pressure should be reduced ≤15mmHg

1. Tulsa SK et al. JSLS 2007; 11:433-447

Port Placement for LSCP

- 12mm Optivew trocar in the infraumbilical space
- 12mm Optiview trocar in RLQ (2cm superior and medial to the right ASIS)
- 5mm trocar in left paramedian region (10cm lateral to the infraumbilcal port)
- 5 mm trocar either in the suprapubic region or LLQ

Port Placement for LSCP



Reproduced from: Moore RD, Mikles JR. Surg Technol Int 2008; 17:199-202

Port Placement for LSCP

- surgeon → left side, sutures using LUQ port and suprapubic port
- 1st assist → right side, holds laparoscope, introduces the needle and passes it to the surgeon, performs extracorporeal knot tying
- 2nd assist → between legs, manipulates vaginal probe for exposure during suturing

Port Closure

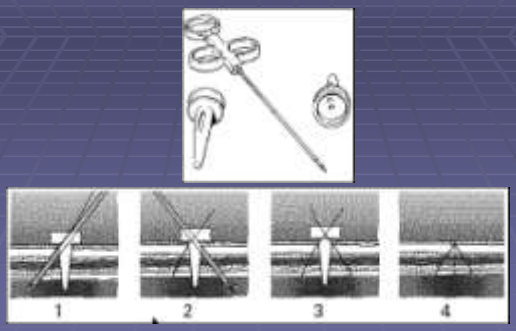
- all 10 and 12mm ports should be closed
- incorporate peritoneum into fascial closure
- standard suturing → often done blindly

Port Closure

- closure facilitated by a number of techniques and devices
  - Carter-Thomason Close-Sure System
  - two parts → Pilot guide and suture passer
  - the suture passer pushes the suture through the guide, the fascia, the muscle, and the peritoneum
  - Elashry et al. → this device facilitates the fastest trocar wound closure with 100% interoperative success and no post-operative closure-related complications[1]

1. Elashry O. et al. J Am Coll Surg 1996; 183: 333–344

Port Closure



Reproduced from: Shalhav G. Surg Endosc 2007; 21:1264-1274

Port Closure

- remove RLQ cannula and place the guide into the RLQ incision
- pass an 0 vicryl suture using the suture passer down one side, then retrieve it on the other side also using the suture passer
- suture is tagged and the cannula is reinserted into the incision under direct visualization

Port Closure

- remove laparoscope from umbilical cannula and place in RLQ cannula
- direct laparascope toward umbilicus
- place Pilot guide in umbilical incision
- pass 0 vicryl tie in a similar fashion
- remove guide
- remove all other ports under direct visualization
- tie down vicryl ties
- close skin at all four incisions

Port Pitfalls

- PATIENT FACTORS
  - obesity:
    - insert Veress needle at 90°
    - be aware of angle of insertion for secondary ports and any adipose tissue that may limit rotation
    - place ports closer to site of operation (or ask for longer cannulas and instruments)
    - more complications with the Veress needle
    - Hassan requires a larger incision
  - very thin:
    - adjacent organs and vessels are closer to the abdominal wall

Port Pitfalls

- PATIENT FACTORS
  - previous surgery:
    - difficulty with Veress needle placement due to abdominal wall adhesions
    - limitations in insufflation
    - place trocar sites away from scars
  - medical comorbidity:
    - may increase risk of wound infection
    - may result in variation in size and course of parietal blood vessels (ie. portal hypertension) and increase risk of vascular injury

Port Pitfalls

- SURGEON FACTORS
  - surgeon experience is very important in reducing port-site complications
  - experience = skill at accurate port placement, preventing inadvertent injury, and maximizing instrument ergonomics/minimizing OR fatigue
  - adequate training is required
- PORT DESIGN
  - evolved and improved
  - nonbladed trocars decrease port site wound complications

Port Pitfalls

- Complications
  - Vascular
    - incidence of major vascular injuries = 0.04 to 0.5%[1]
    - most common → local hemorrhage from trocar
    - other injuries → iliac vein, greater omental vessels, IVC, aorta, pelvic and superior mesenteric veins, lumbar veins
    - transilluminate abdomen to avoid superficial vessels
    - always visualize inferior epigastric vessels

1. Munro MG. Curr Opin Obstet Gynecol 2002; 14:365-374

Port Pitfalls

- Complications
  - Vascular
    - radially expanding ports cause significantly less abdominal wall bleeding[1]
    - injury to abdominal wall vessels usually occur due to position of secondary ports
    - remove ports under direct visualization
    - suture ligation is preferable over extensive diathermy
    - injured major vessel → convert to an open approach

1. Ramshaw BJ, et al. Surg Endosc 2006; 20: 958-968

Port Pitfalls

- Complications
  - Visceral
    - incidence of visceral injuries = 0.06 to 0.08%[1]
    - most created by insertion of initial port
    - more common with adhesions
    - Bishoff et al. → 58% in small bowel, 32% in colon, 7% in stomach[2]
    - early diagnosis → laparoscopic repair
    - delayed diagnosis → laparotomy
    - later presentations → peritonitis, abscess, enterocutaneous fistula, death

1. Ramshaw BJ, et al. Surg Endosc 2006; 20: 958-968

Port Pitfalls

- Complications
  - Hernia
    - incidence of incisional dehiscence and hernias = 0.02%[1]
    - under reported → failure to diagnose, delay in diagnosis, patient tolerance of asymptomatic hernia, publication bias
    - avoid by → closing all ports >10mm, include peritoneum in musculofascial closure, use radially expanding ports or blunt ports that produce smaller defects

1. Hasty JH, et al. Obstet Gynecol 1994;84:881–4

Port Pitfalls

- Complications
  - Wound Infection
    - uncommon, incidence = 0.2%[1]
    - most are minor skin infections
    - treat with expectant management, drainage, or antibiotics
    - prevention → pre-operative antibiotics given within 30 minutes of incision, give second dose if surgery longer than 4 hours

1. Fahlenkamp D, et al. J Med 1999;168: 765-71

Port Pitfalls

- Complications
  - Extra Peritoneal Gas
    - usually mild and limited to abdominal wall
    - due to malposition of insufflation port with CO_2 gas tracking into preperitoneal, retroperitoneal, or subcutaneous spaces
    - can track into the neck, mediastinum, pericardium,
    - can cause hypercapnea, respiratory acidosis, and cardiovascular collapse
    - treatment in severe cases and involves mechanical ventilation

Port Pitfalls

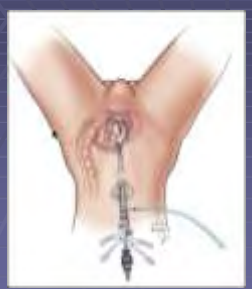
- Complications
  - Neuropathies
    - ilioinguinal = sensation to inguinal canal
    - iliohypogastric = sensation to supapubic region
    - genitofemoral = sensation to labia and superior thigh
    - risk of injuring these nerves increases when trocars placed inferior to the ASIS
    - injury → sharp, burning pain, parasthesia

The Future: Single Port?

- 1.8cm umbilical incision
- open technique to place multichannel single port
- 5mm flexible tip laparoscope
- articulating instruments
- LSC Vs. robotic LSC Vs. single port LSC[1]
  - no difference in operative time, length of stay, subjective pain at discharge
  - post-operative POP-Q evaluations were similar at 3 and 6 months
  - mesh introduced paravaginally using Stamey needles

1. White WM, et al. Urology 2009; 74: 1008-1012

The Future: Single Port?



Reproduced from: White WM, et al. Urology 2009; 74: 1008-1012

Thank You

Deep Anterior and Posterior Dissection and Vaginal Graft Application

Abdominal Sacral Colpopexy (perineopexy)

Douglass S. Hale, M.D., FACOG, FACS
Female Pelvic Medicine and Reconstructive Surgery Fellowship
Indiana University Health System

Disclosures

- Relevant financial relationships exist with the following commercial interests:
  - Consultant: Women's Health and Urology
  - Funded Research: Allergan

Objectives:

1. Review the anatomy of vaginal vault support
2. Understand the evolution of the abdominal sacral colpoperineopexy
3. Become familiar with the surgical steps for this procedure

Nomenclature

- Sacropexy
- Sacrocolpopexy
- Sacral colpopexy
- Colpopexy
- Colposacropexy
- Colpoperineopexy

PELVIC SUPPORT

- BONE
- MUSCLE
- "LIGAMENTS"
- FASCIA

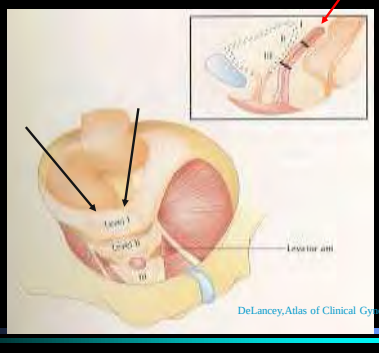
DeLancey,Atlas of Clinical Gynecology,2000

LEVELS of SUPPORT

- Level 1
- Level 2
- Level 3

DeLancey,Atlas of Clinical Gynecology,2000

Intra-abdominal forces push the arch downward



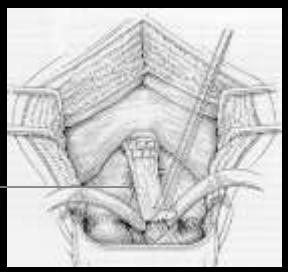
Sacral Colpopexy Evolution

FE Lane, Repair of posthysterectomy vaginal-vault prolapse. Obstet Gynecol 1962;20(1):72.

- Single graft strip
- Cone around vaginal apex
- Double leaf graft
- Extension to perineal body
- 3 compartment with extensive vaginal coverage
  - Deep anterior (vesico-vaginal) and posterior dissection (recto-vaginal)

Standard Sacral Colpopexy

Single leaf graft

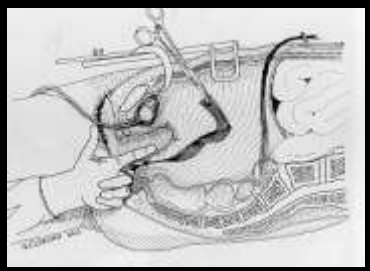


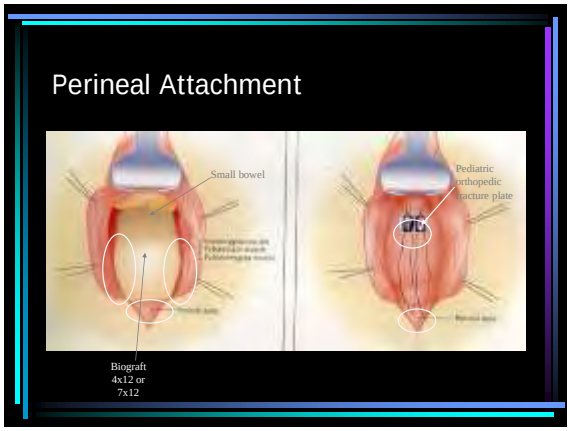
Timmons/ Addison Modification

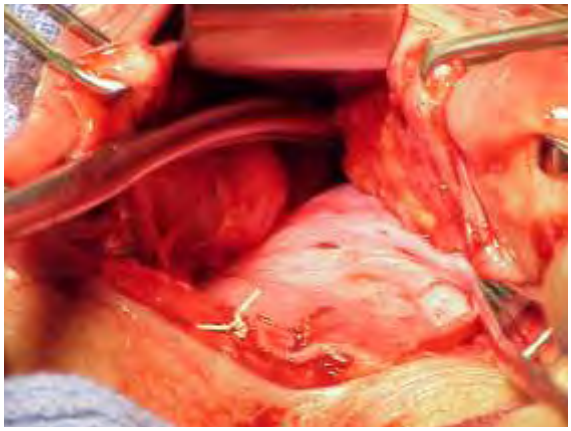
Cone around entire vaginal apex

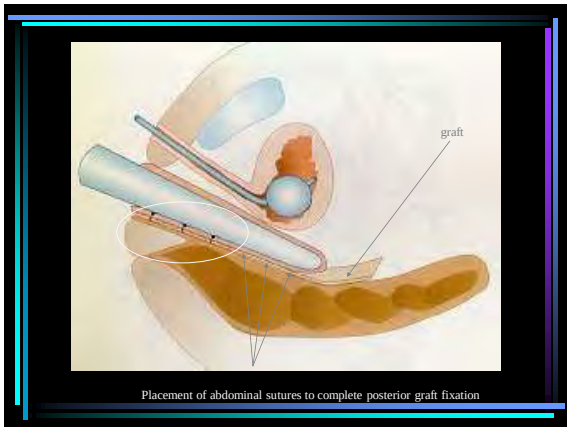
Timmons/ Addison Modification

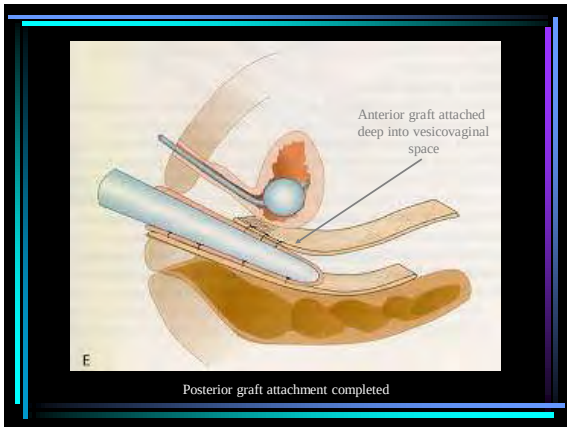
Abdominal approach to perineal body

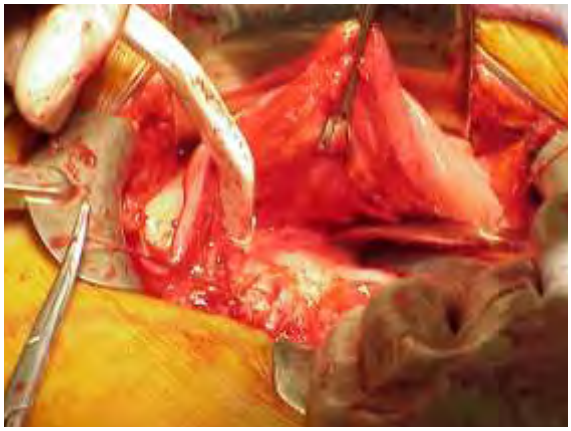


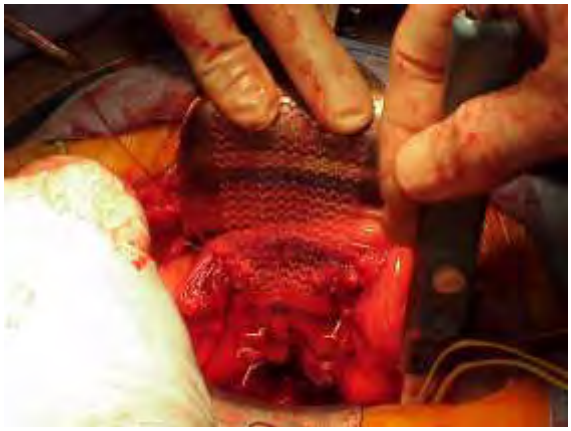

Perineal Attachment
Small bowel
Pediatric orthopedic fracture plate
Biograft 4x12 or 7x12

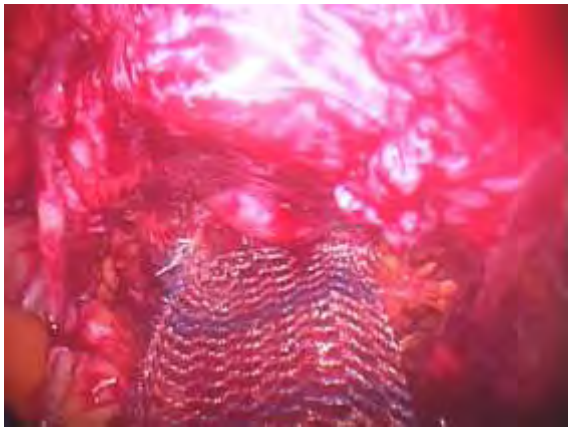


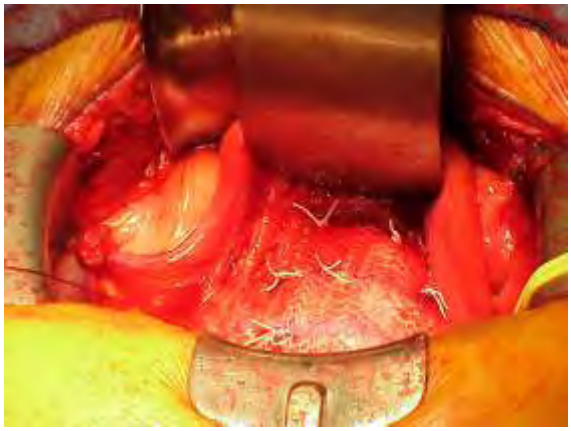

graft
Placement of abdominal sutures to complete posterior graft fixation


Anterior graft attached deep into vesicovaginal space
E
Posterior graft attachment completed









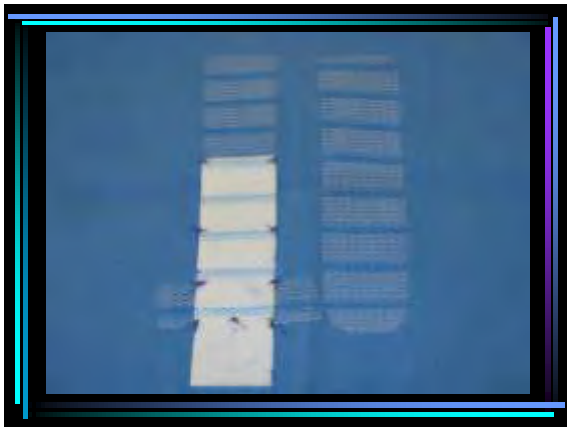
Video

Summary

1. TVH if indicated
2. Place sling if needed
3. May dissect spaces vaginally if performing a TVH
4. Lucite rods
5. Traction and counter traction

Summary

5. Use your eyes!
6. Wide dissections
7. Deep dissections
8. Retroperitonealize graft
9. Cystoscopy to check ureteral integrity
10. Antibiotic irrigation



Vesico-vaginal space dissection

- Lucite stent
- Foley bulb
  - May need to fill and drain bladder
- Shiny white muscularis
- To just above level of trigone
  - Fan retractor
- Wide placement with 1.5-2.0cm separation of anterior and posterior leaves laterally (may need to suture outside of mesh borders)

Recto-vaginal space dissection

- Lucite stent or stents
- Shiny white muscularis
- Laterally to levator ani
- Distally to rectovaginal septum or perineal body
- Wide placement with 1.5-2.0cm separation of anterior and posterior leaves laterally

Conclusions

- Abdominal sacral colpoperineopexy provides complete vaginal wall support.
  - Technique does make a difference
- It makes anatomic sense.
- Deep and wide application of mesh needed.
  - Mesh typically 4cm – 5cm wide
- Recent series of laparoscopic and robotic sacral colpopexies will impact the data, supporting a minimally invasive approach.

LSCP Suturing

Dr. Colleen D. McDermott MD, FRCSC
August 30th, 2011

St. Michael's
Inspired Care. Inspiring Science.

Objectives

- Instruments
- Technique
- Vaginal Suturing
- Peritoneal Suturing
- Sacral Suturing

Instruments

- 5mm Needle Drivers x 3 (Ethicon)


Instruments

- Extracorporeal Knot Tying
- **Closed** Versus Open Knot Pusher

Technique

- Suture Load:
  - Swage of needle at very tip of the needle driver
  - End of suture through closed knot pusher with snap on end
- Suture introduced through 12mm RLQ cannula by assist
- Needle passed through cannula with tip of needle facing up (anteriorly)
- Assist now ready to pass needle to surgeon

Technique

- Forehand
  - Needle tip points anteriorly
  - Surgeon grabs needle in body of needle 1/3 of way from swage

Technique

- Backhand
  - Needle tip flipped 180°, points posteriorly
- Assist to throw stitch
  - Assist turns needle driver 90° counter clock wise so tip of needle is in plane of surgeon's needle driver
  - Surgeon grabs tip of needle and rotates needle driver 90° either counter clock wise (forehand) or clockwise (backhand) → assist now set up to grab body of needle and throw stitch

Technique

- Stitch is placed and tied down
- Needle is passed back to assist
- Needle brought up through 12mm cannula under direct visualization
- Needle cut off and suture tied down using closed knot pusher
- Visualize each knot as being pushed into abdomen
- Suture cut through any available port

Vaginal Suturing

- Posterior Mesh
  - Attach first
    - Identify posterior graft and bring proximal end into abdomen so mesh is lying flat
  - If the abdominal-vaginal route used:
    - Identify distal suture placed during vaginal portion
  - First stitch:
    - 2cm cephalad to highest stitch placed during vaginal portion of case
    - If only abdominal route used, place next suture approximately 2-4 cm cephalad to plane of ischial spines

Vaginal Suturing

- Posterior Mesh
  - Suture placed through rectovaginal fascia
  - Not full thickness, ie. vaginal epithelium not exposed to suture material
  - Pass needle with 180° torque of wrist rather than longitudinal movements
  - Once through skin → grasp needle tip, deliver remainder of needle to swage, reload needle, drive through mehs (anterior to posterior direction)

Vaginal Suturing

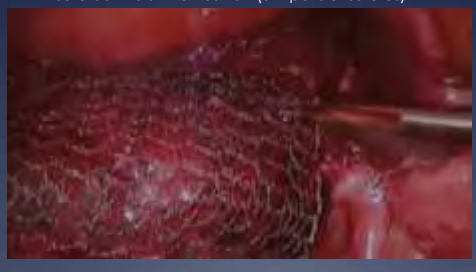
- Posterior Mesh

Vaginal Suturing

- Posterior Mesh
  - Suture grabbed by assist, pulled out of cannula, tied down
  - Tip: lift posterior mesh up anteriorly so it lies against the vagina while knot being tied down, knot will then be posterior to mesh rather than between mesh and vagina
  - Left side → forehand throws
  - Right side → backhand throws
  - 3-4 pairs of sutures on either side of the mesh, 2cm apart

Vaginal Suturing

- Anterior Mesh
  - Brought into abdomen
  - Sutured in a similar fashion (3-4 pairs of sutures)



Vaginal Suturing

- Suture Type
  - Nonabsorbable sutures (2-0 Ethibond/polyethylene terephthalate with SH needle)
  - Distal sutures for anterior mesh at level of the UVJ → 2-0 PDS/ polydioxanone with SH needle
  - Tip → 5mm fan retractor to keep bladder out of these distal sutures

Vaginal Suturing

- Sheppard et al.[1]
  - Retrospective
  - ASC patients using 2-0 Ethibond (n=161) versus 2-0 PDS (n=254)
  - Significantly more mesh/suture erosions in Ethibond group (3.7% versus 0)
  - No difference in prolapse recurrence (1.7% Ethibond and 0% PDS)
  - Conclusion → PDS reduced the risk of mesh/suture erosion without increasing the risk of surgical failure

1. Sheppard, JP. Female Pelvic Med Reconstr Surg 2010;16: 229-233

Peritoneal Suturing

- Peritoneum incised over sacral promontory down to vagina
- Pass temporary suture through medial cut edge of incised peritoneum (2-0 Ethibond)
- Pull needle back through cannula and cut off
- Pass two free ends back in abdomen

Peritoneal Suturing

- Pass Carter Thomason Close Sure device through RUQ (lateral to port) and retrieve both ends of sutures
- Bowel/Sigmoid retracted to left side using suture as a "bowel hammock"
- Suture ends pulled up through anterior abdominal wall and snapped in place
- Alternatively, sigmoid epiploicae can be sutured to left side of anterior abdominal wall

Peritoneal Suturing

Peritoneal Suturing

- Recommend closing peritoneum over mesh
  - Reduce bowel adhesions to mesh and complications with bowel obstruction (although reports in the literature say the contrary[1])
  - Straightforward closure, 5-10 minutes
  - 2-0 monocryl (poliglecaprone 25) on a CT-1 needle, run from sacrum down to vagina
  - Identify right ureter to ensure not included in closure
  - Use retention suture to guide closure then remove

1. Elneil S, et al. *BJOG. Apr 2005;112(4):486-489*

Peritoneal Suturing

- Distal end → first secured with a Lapra-Ty and needle then removed from abdomen
- Proximal end →suture pulled taught to close peritoneum over mesh, Lapra-Ty used to secure, suture cut and removed
- Gaps → close with figure-of-8 suture using 2-0 Monocryl
- Knotless barbed suture (V-loc)[1]
  - Thubert et al.[2] → small bowel volvulus
  - Time saving?

1. Deffieux X, et al. *J Gynecol Obstet Biol Reprod (Paris). Feb;40(1):65-67*
2. Thubert T, et al. *J Pelvic Floor Dysfunct. Jan 2011.*

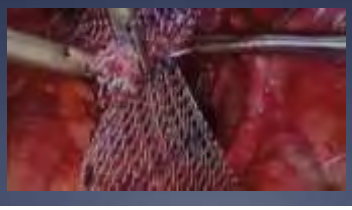
Peritoneal Suturing

Sacral Suturing

- Most critical part of LSCP
- May be done by surgeon or assist
- 2 to 4 non-absorbable sutures (2-0 ethibond with SH needles)
- Find appropriate level for suturing on two straps of mesh
- First Suture
  - Through both straps of mesh
  - Through midline of anterior longitudinal ligament (vertebral level S1 to S2), medial retraction of sigmoid with free hand
  - Pass back through both straps of mesh again
  - Remove suture through cannula and tie knot extracorporeally

Sacral Suturing

- Trim redundant mesh
- Pass other two sutures through and through the mesh and ligament
- Each suture should be approximately 1cm cephalad from the last, moving towards the sacral promontory



Sacral Suturing

- Sutures versus titanium helical tacks (Pro Tack device)
  - More secure (?)
  - Less expensive
  - Nosseir et al[1] → case of sacral osteomyelitis after insertion of tacks, without evidence of mesh erosion, abscess, or fistula

1. Nosseir SB, et al. *Obstet Gynecol. Aug;116 Suppl 2:513-515.*

Thank You

Robotic-Assisted LASCP: Port Placement, Mechanics & Pitfalls

ICS Annual Scientific Meeting 2011
Glasgow, Scotland

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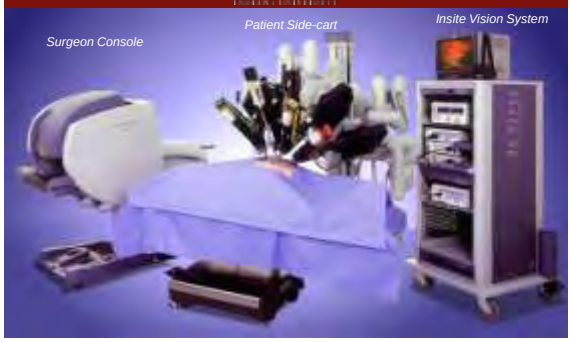
Disclosure

- Although all care was taken to attempt to avoid commercial bias in this mini-lecture, there is only one Robotic system currently on the market for Robotic-assistance
- DaVinci (Intuitive Surgical, Sunnyvale, CA)

Background

- Abdominal Sacral Colpopexy (ASC)
  - -Gold standard for vaginal apical prolapse
  - -Greater postoperative morbidity than vaginal procedures
- Laparoscopic Sacral Colpopexy (LSC)
  - -First reported by Nezhat et al, 1994
- Robotic-Assisted Laparoscopic Sacral Colpopexy (RLSC)
  - -Initial description by DiMarco et al, 2004



******Articulate laparoscopic instruments***

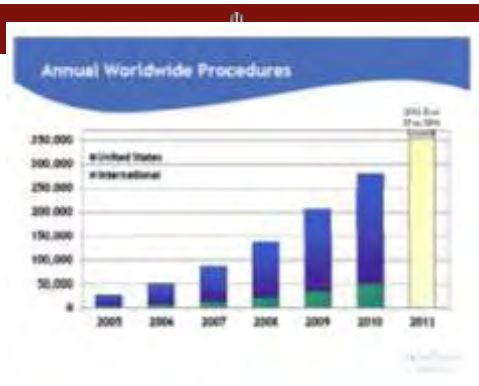
**** Six degrees of wrist motion***
**** Precision of movement***
**** Reduced hand tremor***

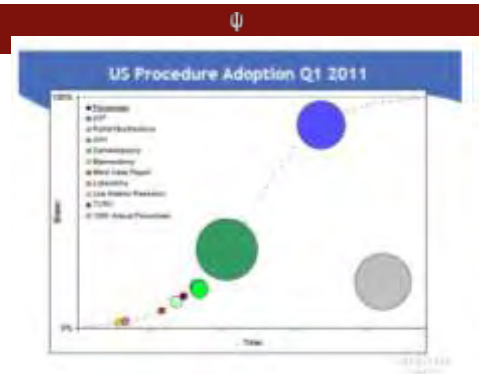
Three dimensional image of the surgical field

DaVinci Benefits

- Less need for pain medication[2]
- Less blood loss and fewer transfusions[1,3]
- Fewer complications and lower conversion rate[1,4]
- Shorter hospital stay[1,3,4]
- Quicker recovery and fast return to normal daily activities[1,4]

1 Payne, T. N. and F. R. Dauterive (2008). "A comparison of total laparoscopic hysterectomy to robotically assisted hysterectomy: surgical outcomes in a community practice." J Minim Invasive Gynecol 15(3): 286-291.
2 Piquion-Joseph, J. M., A. Nayar, et al. (2009). "Robot-assisted gynecological surgery in a community setting." J Robotic Surg: 1-4.
3 Payne, T. N., F. R. Dauterive, et al. (2010). "Robotically assisted hysterectomy in patients with large uteri: outcomes in five community practices." Obstet Gynecol 115(3): 535-542.
4 Bell, MC, Torgerson J, et al. (2008) "comparison of outcomes and cost for endometrial cancer staging via traditional laparotomy, standard laparoscopy, and robotic techniques" GynecolOncol 111(3) 407-411.





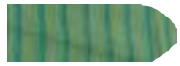
Port Placement – Evolution

- 12 mm accessory port
- 8 mm robotic arm port
- 12 mm camera port
- 5 mm accessory port
- 8 mm robotic arm port

- 12 mm accessory port
- 8 mm robotic arm port
- 12 mm camera port
- 8 mm robotic arm port
- 8 mm robotic arm port

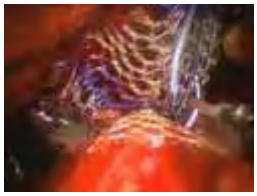
Surgical Technique

- Dorsal lithotomy with shoulder restraints
- Vaginal rectocele
  - -Performed if indicated
- Pelvicol attached to perineal body
- Laparoscopic dissection retroperitoneum
- Anterior deep dissection
- Laparoscopic attachment of anterior & posterior grafts to the vagina

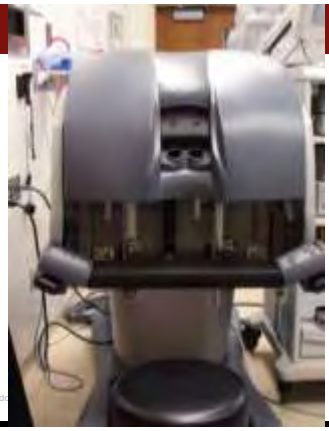


Porcine Dermis / Soft Prolene grafts

Surgical technique – Mechanics



- Both mesh leafs secured tension free to the sacrum
- Polypropylene graft is retroperitonealized
- Port site fascial defects >7mm closed



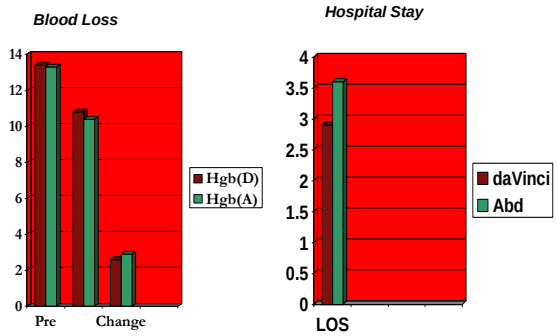
Video

Typical Results

- Retrospective chart review
  - -May 2003 to October 2005 (n=77)

POPQ Stage	Anterior Wall	Posterior Wall	Vaginal Vault
Stage 0	3	7	0
Stage 1	3	10	34
Stage 2	27	25	15
Stage 3	37	27	20
Stage 4	7	8	8

Shariati A, Maceda JS, Hale DS. Da Vinci assisted laparoscopic sacrocolpopexy: Surgical technique on a cohort of 77 patients. J Pelv Med Surg, 2008;14(3):163-71.



Complications

- 7 (9%) with erosion – 3 (4%) to OR
- 5 (6.5%) incidental cystotomy
- 5 (6.5%) post-op ileus
- 4 (5%) had de novo SUI, subsequent TVT
- 2 (2.6%) *c. diff* colitis
- 2 (2.6%) fever from UTI
- 1 (1.3%) with prolapse to introitus
- 1 (1.3%) converted to laparotomy

Post-op Symptom Evaluation

Post-op	1 yr daVinci (n=53)	1 yr ASC (n=45)	P Value
Pelvic Pain	3 (5.7%)	6 (13.3%)	0.294
Pain with Intercourse	5 (9.6%)	4 (8.9%)	1.0
Prolapse Symptoms	3 (5.7%)	5 (11.1%)	0.464
New Incontinence	3 (5.7%)	5 (11.1%)	0.466
Go through Surg Again	50 (94%)	33 (73.3%)	0.009

Pitfalls

- Arm conflict
- Training
  - Pay for Training: Pig Lab, Observe 7 Proctor
  - (20) procedures/y to be listed as Provider
- With this hammer, everything looks like a nail
- Training & availability of special OR team
- Expense of Unit & Service Contract

Conclusions

Laparoscopic robotic assisted sacral colpoperineopexy
- ✓Robotic technology is reliable
- ✓Low conversion rate to laparotomy
- ✓Low complication rate

Future studies
- ✓Long term vaginal support
- ✓Economic analysis
- ✓Quality of life

Questions?

Concomitant Urinary Incontinence Surgery

Douglass S. Hale, M.D., FACOG, FACS
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Disclosures

- Relevant financial relationships exist with the following commercial interests:
  - Consultant: Women's Health and Urology
  - Funded Research: Allergan

Objectives

1. Review the data for incontinence surgery combined with prolapse surgery for occult urinary incontinence.
2. Suggest treatment options for patients with occult stress urinary incontinence.

Occult Incontinence

- Few studies to guide decisions
  - Anti-Incontinence procedure or not
- Defining "occult incontinence"
  - Reduction
  - Type of reduction
  - Catheters
  - Bladder volume

Clinical relevance of urodynamic investigation tests prior to surgical correction of genital prolapse: a literature review Roovers,Int Urogynecol J (2007) 18:455–460

- 1,467 references in Medline

Clinical relevance of urodynamic investigation tests prior to surgical correction of genital prolapse: a literature review Roovers,Int Urogynecol J (2007) 18:455–460

- Patients with genital prolapse and urodynamic stress incontinence before surgery
  - Diagnostic value of urodynamic investigation
    - Stress incontinence is present in about 40% of all patients with genital prolapse . According to a Cochrane review, 25–30% of the women with stress incontinence do not have urodynamic stress incontinence
  - Therapeutic value of urodynamic investigation
    - combining procedures reduces the risk on stress incontinence after surgery but increases the risk on voiding dysfunction.

Clinical relevance of urodynamic investigation tests prior to surgical correction of genital prolapse: a literature review Roovers,Int Urogynecol J (2007) 18:455–460

- Patients with genital prolapse and occult urodynamic stress incontinence before surgery
  - Diagnostic value of urodynamic investigation
    - Stress incontinence is absent in about 60% of all patients with genital prolapse .
      - 36 to 80% of these women are at risk for development of stress incontinence after reconstructive surgery.
  - Therapeutic value of urodynamic investigation
    - If barrier tests are negative, the risk on developing stress incontinence after surgery is believed to be very low. (?)
    - continence rates in the six studies ranged from 86 to 100%. De novo detrusor overactivity ranged from 6 to 30% .

Clinical relevance of urodynamic investigation tests prior to surgical correction of genital prolapse: a literature review Roovers,Int Urogynecol J (2007) 18:455–460

- Diagnostic and therapeutic value of detecting detrusor overactivity in patients undergoing prolapse surgery
  - limited; in almost half of the patients with overactive bladder symptoms, there is no detrusor overactivity visible during urodynamic measurement.
  - detrusor overactivity during urodynamics in women without overactive bladder symptoms (up to 69%)

CARE Trial 2006 N Engl J Med 2006;354:1557-66.

- Assess whether the addition of standardized Burch colposuspension to abdominal sacrocolpopexy for the treatment of pelvic-organ prolapse decreases postoperative stress urinary incontinence ***in women without preoperative symptoms of stress incontinence***
- The primary outcomes included measures of stress incontinence (symptoms, stress testing, or treatment) and measures of urge symptoms.

CARE Trial 2006 N Engl J Med 2006;354:1557-66.

- Results
  - 322 women randomized (157 Burch, 165 controls)
  - Enrollment stopped after 3 month interim analysis
  - 44.1% in control met criteria
  - 23.8% in Burch group
  - Bothersome
    - 24.5% -control
    - 6.1% -Burch
  - OAB
    - 38.4% control
    - 32.7% Burch

CARE Trial 2006 N Engl J Med 2006;354:1557-66.

- Conclusion
  - In women without stress incontinence who are undergoing abdominal sacrocolpopexy for prolapse, Burch colposuspension significantly reduced postoperative symptoms of stress incontinence without increasing other lower urinary tract symptoms.

Abdominal sacrocolpopexy and urinary incontinence: surgical planning based on urodynamics Am J Obstet Gynecol 2010;202:375.e1-5

- Evaluate the use of urodynamics to determine the need for incontinence surgery at the time of abdominal sacrocolpopexy (ASC).
- "Our philosophical belief is to consider USI and occult USI to be 1 entity."

Abdominal sacrocolpopexy and urinary incontinence: surgical planning based on urodynamics Am J Obstet Gynecol 2010;202:375.e1-5

- Post op incontinence if there was any comment of incontinence on the chart as recorded by any health care practitioner.
- Similarly, a patient was considered to have urgency/ frequency (UF) if she subjectively reported having UF either volunteering the information on intake or responding positively when questioned.

Abdominal sacrocolpopexy and urinary incontinence: surgical planning based on urodynamics Elser,Am J Obstet Gynecol 2010;202:375.e1-5

- Results - 441 charts
  - 204 with USI (82 with occult)
  - 237 without USI

Abdominal sacrocolpopexy and urinary incontinence: surgical planning based on urodynamics Elser,Am J Obstet Gynecol 2010;202:375.e1-5

Rates of postoperative incontinence and UF in women undergoing abdominal sacrocolpopexy

Variable	Group 1, women with USI who received incontinence procedure	Group 2, women without USI who did not receive incontinence procedure	Total	P value, group 1 vs. group 2	OR (95% CI)
Any symptoms of incontinence, 6 wk visit	12.7% (26/204)	7.2% (17/237)	9.8% (43/441)	.049*	1.890 (0.984–3.634)
UF, 6 wk visit	22.2% (45/203)	8.4% (20/237)	14.8% (65/440)	< .001*	3.000 (1.756–5.438)
Any symptoms of incontinence, last visit (mean, 48.6 wk)	13.4% (22/164)	13.3% (28/211)	13.4% (50/375)	.967	1.013 (0.586–1.845)
UF, last visit	22.0% (36/164)	14.8% (29/207)	17.9% (65/371)	.046*	1.726 (1.007–2.960)

UF, urge incontinence; USI, urodynamic stress incontinence.

*Statistically significant.

Abdominal sacrocolpopexy and urinary incontinence: surgical planning based on urodynamics Am J Obstet Gynecol 2010;202:375.e1-5

- Conclusions
  - Recommend results of urodynamic testing should be used to selectively treat incontinent women with a sling or Burch at the time of ASC.
  - Recommend that patients without stress incontinence should not undergo an antiincontinence procedure at the time of ASC.
  - Adding an unindicated procedure to benefit a minority of patients seems unacceptable

Prolapse Surgery and Negative Reduction Testing

- Patients undergoing Prolift – 355 patients
  - 244 (71%) combined anterior and posterior mesh
  - 66 (20%) underwent anterior mesh only
  - 23 (8%) underwent posterior mesh only.
  - 309 underwent urodynamics
    - 111 were stress continent
      - **27 (24.3%) with denovo stress incontinence**

Aungst, Am J Obstet Gynecol 2009;201:73.e1-7.

Prolapse Surgery and Negative Reduction Testing

- Patients undergoing sacral colpopexy
  - 38.2 % (no Burch) to 20.8% (Burch) (CARE)
  - 18.6% (13/70) (Park)
- Patients undergoing Prolift
  - 25% (15/60) de novo stress incontinence (Kasturi)
  - 24.3% (27/111) Aungst, Am J Obstet Gynecol 2009;201:73.e1-7.

Prolapse Reduction Method

Visco, Int Urogynecol J (2008) 19:607–614.

- Urodynamic stress incontinence without prolapse reduction
  - 12 of 313 (3.7%)
- Overall, at 300-ml bladder volume, with prolapse reduction
  - 27% (78/293) of subjects leaked during reduction testing with either the first or the second assigned method.
  - More women leaked after the second method of reduction (65/291 = 22%) than after the first (47/293 = 16%; p = 0.012).
- Overall, urodynamic stress incontinence with barrier reduction was diagnosed in 19% of subjects (112/584)
  - pessary having the lowest rate of detection (6%)
  - speculum the highest (30%).

Prolapse Reduction – Occult Incontinence

Method of reduction	% leakage
Pessary	6% (5/88)
Manual	16% (19/122)
Swab	20% (32/158)
Forceps	21% (21/98)
Speculum	30% (35/118)

Visco, Int Urogynecol J (2008) 19:607–614.

Prolapse Reduction Method

Visco, Int Urogynecol J (2008) 19:607–614.

- Women who demonstrated preoperative USI during prolapse reduction were more likely to report postoperative stress incontinence, regardless of concomitant colposuspension.
- Control group 58% (+ w/reduction) vs. 38% (no leak with reduction)(p = 0.04)
- Burch group 32% (+with reduction) vs. 21% (no leak with reduction) (p = 0.19)

The use of the pessary test in preoperative assessment of women with severe genital prolapse

Liapis, European Journal of Obstetrics & Gynecology and Reproductive Biology 155 (2011) 110–113

- Prospective Stg III + IV urogenital prolapse
- No symptoms of UI and + occult stress test (pessary)
  - Group I (43 pts) – TVH, A+P repair, TVT-O
  - Group II (39 pts) – TVH, A+P repair

The use of the pessary test in preoperative assessment of women with severe genital prolapse

Liapis, European Journal of Obstetrics & Gynecology and Reproductive Biology 155 (2011) 110–113

	Group 1	Group 2	p value
Objective			
Cure	90.7% (39 pts)	71.8% (28 pts)	0.09
Improvement	2.3% (1 pts)	10.2% (4 pts)	0.86
Failure	7% (3 pts)	17.9% (7 pts)	0.59
Subjective			
Cure	81.4% (35 pts)	77.0% (30 pts)	0.89
Improvement	9.3% (4 pts)	10.2% (4 pts)	0.25
Failure	9.3% (4 pts)	12.8% (5 pts)	0.37

3 month data

	Group 1	Group 2	p value
Objective			
Cure	86% (37 pts)	53.8% (21 pts)	0.02
Improvement	7.0% (3 pts)	23.0% (9 pts)	0.03
Failure	7.0% (3 pts)	23.0% (9 pts)	0.00
Subjective			
Cure	83.7% (36 pts)	56.4% (22 pts)	0.04
Improvement	9.3% (4 pts)	15.4% (6 pts)	0.49
Failure	7.0% (3 pts)	28.0% (11 pts)	0.09

2 year data

OAB Persistent/ De Novo Following Sling

- 5% to 25% of women will report persistent, worsening, or de novo OAB after sling surgery

Saiadi, Curr Urol Rep. 2010 Nov;11(6):366-71.

Conclusions

- Discuss possibilities with your patient
- Making an asymptomatic patient symptomatic (either de novo urge or stress) is one of greatest patient dissatisfiers

Conclusions

- Options USI (or occult) and Prolapse
  - Two stage
  - **Perform anti-incontinence procedure**
  - Risk of OAB/ VD
- Options for No Stress Leakage with Prolapse Reduction
  - Colpopexy 13.3% (Elser) - 18.6% (Park) - 38% (CARE)
  - TVM – 24-25% leakage

ADDITIONAL READING:

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Take-Home Messages:

1. Once laparoscopic knot-tying is mastered, there are few hurdles to incorporating LASCP into your practice.
2. Laparoscopic approaches offer benefits of lower blood loss, quicker short-term and long-term convalescence, better visualization and improved retraction, for the drawbacks of added expense and time. However, offering "minimally-invasive" options can drive referrals and advertising.
3. Type I (knitted, open pore) meshes offer superior characteristics for pelvic reconstruction.
4. Fear of mesh erosion should not keep you from using mesh to augment a prolapse repair in the appropriate patient.
5. There are several specialized and improvised devices available that can assist in laparoscopic procedures. Graft materials, port placement, instrumentation, technique, and other tips and tricks can help you complete your surgery and keep you out of trouble.

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