WORK SHOP

CAPE TOWN – TIPS AND TRICKS
CONVENTIONAL LAPAROSCOPIC SACRO-COLPOPEXY AND HYSTEROPEXY

Pr Bruno DEVAL, MD

Geoffroy Saint-Hilaire – Private Hospital
Hotel – Dieu de Paris
Paris V University
HISTORY OF HSYERO-SACRO - COLPOPEXY

58 years old: OPSC
21 years old: LSC
11 years old: RSC

• Arthure H et al.
  – Uterine prolapse and prolapse of the vaginal vault treated by sacral hysteropexy.
    • *BJOG: an international journal of obstetrics and gynaecology*. 1957

• Huguier et al.
  – Posterior suspension of the genital axis on the lumbosacral disk in the treatment of uterine prolapse.
    • *Presse Med* 1958

• Nezhat C et al.
  – Laparoscopic sacral colpopexy for vaginal vault prolapse.
    • *Obstetrics and gynecology*. 1994

• Eliott D et al.
  – Gynecologic use of robotically assisted laparoscopy: Sacrocolpopexy for the treatment of high-grade vaginal vault prolapse
    • *Am J Surg*. 2004
MINI-LAPAROSCOPY
SACROCOLPOPEXY FOR APICAL AND POSTERIOR FEMALE GENITAL PROLAPSE

F. LUTFALLAH, MD, C. PETTENATI, MD, A.PIGNE, MD, B.DEVAL, MD.PhD

Gynecology department, Générale de santé, GEOFFROY SAINT HILAIRE CLINIC, PARIS, FRANCE.
- Age, overweight or obesity
- Prior abdominal or pelvic surgery, Uterine Pathology
5 STEPS OF THE PROCEDURE
A. Prepare carefully sacral promontory and avoid excessive dissection. All the anatomic landmark should be recognized (Vessels +++)

B. Wide preparation of the vaginal walls

C. Prefer polypropylene meshes vs Polyester mesh

D. Use re-absorbable suture on the vagina.

E. Avoid folding and wrinkling, the mesh must be well stretched

F. Fix the mesh on the posterior vaginal wall and not on the elevator ani muscle

G. Use non-absorbable suture to fix the meshes on the sacrum

H. Avoid excessive tension on the meshes

I. Close the retroperitoneum

J. Do not perform contemporary Burch procedure or tape
A PubMed online search performed from 01 January 1991 to 31 December 2014 using laparoscopy, laparoscopic, sacrocolpopexy, sacral and colpopexy, pelvic organ prolapse.

180 manuscripts were initially identified,

Only English-language studies with over 40 patients were included, resulted in choice of 28 papers
ANATOMICAL RESULTS

LAPAROSCOPIC SACROCOLPOPEXY FOR FEMALE GENITAL PROLAPSE: A COMPREHENSIVE REVIEW

Bruno DEVAL\textsuperscript{a}, Denise Hatsumi de Freitas Yanasse ORTEGA\textsuperscript{b}, Hisham A. Majeed FAHIM\textsuperscript{b}, Jorge Milhem HADDAD\textsuperscript{d}

(Submited)

<table>
<thead>
<tr>
<th>$N$</th>
<th>$N$ F.U</th>
<th>Mean FU (Month)</th>
<th>OBJ. CURE</th>
<th>SUBJ. CURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3142</td>
<td>2721 (86.8%)</td>
<td>23.3</td>
<td>2396/2676 89.5 %</td>
<td>2049/2286 89.6%</td>
</tr>
</tbody>
</table>
### Functional Results

**Laparoscopic Sacrocolpopexy for Female Genital Prolapse: A Comprehensive Review**

Bruno DEVAL\(^a\) Denise Hatsumi de Freitas Yanasse ORTEGA\(^b\) Hisham A.Majeed FAHIM\(^b\), Jorge Milhem HADDAD\(^d\)

*(Submitted)*

<table>
<thead>
<tr>
<th>Denovo SUI</th>
<th>De Novo Dyspareunia</th>
<th>Denovo Dyschesia</th>
</tr>
</thead>
<tbody>
<tr>
<td>200/2180 (9.1%)</td>
<td>104/1200 (8.6%)</td>
<td>181/1720 (10.5%)</td>
</tr>
<tr>
<td>N</td>
<td>Conversion to Laparotomy</td>
<td>Bladder Injury</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>3030</td>
<td>58/3030</td>
<td>51/3030</td>
</tr>
<tr>
<td></td>
<td>(1.9%)</td>
<td>(1.7%)</td>
</tr>
</tbody>
</table>
## Complication

<table>
<thead>
<tr>
<th>Complication</th>
<th>TOTAL*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urinary infection</strong></td>
<td>69 (2.5%)</td>
</tr>
<tr>
<td><strong>Voiding dysfunction</strong></td>
<td>177/2721 (6.5%)</td>
</tr>
<tr>
<td><strong>Related to trocar site</strong></td>
<td>8/2721 (0.3%)</td>
</tr>
<tr>
<td><strong>Wound infection</strong></td>
<td>9 (0.33%)</td>
</tr>
<tr>
<td><strong>Mechanical ileus</strong></td>
<td>9 (0.33%)</td>
</tr>
<tr>
<td><strong>Septical peritonitis</strong></td>
<td>1 (0.03%)</td>
</tr>
<tr>
<td><strong>Bleeding</strong></td>
<td>13/2721 (0.47%)</td>
</tr>
<tr>
<td><strong>Recurrent acute cystitis</strong></td>
<td>1 (0.03%)</td>
</tr>
<tr>
<td><strong>Low back pain or sciatica</strong></td>
<td>19/2721 (0.69%)</td>
</tr>
<tr>
<td><strong>Nerve lesion</strong></td>
<td>3 (0.1%)</td>
</tr>
<tr>
<td><strong>Pain related to mesh</strong></td>
<td>55/2721 (2.2%)</td>
</tr>
<tr>
<td><strong>Detachment of mesh</strong></td>
<td>3/2721 (0.1%)</td>
</tr>
<tr>
<td><strong>Vault infection</strong></td>
<td>2 (0.073%)</td>
</tr>
<tr>
<td><strong>Mesh infection</strong></td>
<td>6 (0.22%)</td>
</tr>
<tr>
<td><strong>Lombosacral spondylodiscitis</strong></td>
<td>7/2721 (0.25%)</td>
</tr>
<tr>
<td><strong>Suture erosion</strong></td>
<td>5 (0.18%)</td>
</tr>
<tr>
<td><strong>Mesh erosion</strong></td>
<td>65/2721 (2.4%)</td>
</tr>
<tr>
<td><strong>Rectovaginal fistula</strong></td>
<td>1 (0.03%)</td>
</tr>
<tr>
<td><strong>Vesicovaginal fistula</strong></td>
<td>3/2721 (0.1%)</td>
</tr>
<tr>
<td><strong>anal pain</strong></td>
<td>5 (0.18%)</td>
</tr>
<tr>
<td><strong>phlebitis</strong></td>
<td>2/2721 (0.073%)</td>
</tr>
<tr>
<td><strong>fever</strong></td>
<td>10 (0.36%)</td>
</tr>
<tr>
<td><strong>stool incontinence</strong></td>
<td>1 (0.03%)</td>
</tr>
</tbody>
</table>
Medium-Term Anatomic and Functional Results of Laparoscopic Sacrocolpopexy Beyond the Learning Curve

Filip Claerhout a, Dirk De Ridder a, Jan Paul Roovers b, Jan Deprest a,*, Heidi Rommens a, Federico Spelzini a, Vanessa Vandenbroucke a, Georges Coremans a, Jan Deprest a,*

a Pelvic Floor Unit, University Hospitals Leuven, Katholieke Universiteit Leuven, Leuven, Belgium
b Department of Obstetrics and Gynaecology, Academic Medical Centre, Amsterdam, The Netherlands

Abstract

Background: Limited prospective data on the anatomic and functional outcome after laparoscopic sacrocolpopexy (LSC) are available in the literature.

Objective: To describe the medium-term anatomic and functional outcome of LSC.

Design, setting, and participants: Prospective consecutive series of 132 women with vaginal vault prolapse undergoing LSC between 2001 and 2006, which was after our learning curve. Patients with urodynamically proven stress incontinence (SI) underwent a concomitant tension-free vaginal tape (TVT) procedure.

Intervention: Patients underwent LSC with a polypropylene implant.

Measurements: Principal outcome measures were anatomic cure (stage 1 or lower) assessed by the Pelvic Organ Prolapse Quantification (POPQ) system and subjective cure and impact on quality of life measured by a standardised interview and, since its introduction in 2004, by a prolapse-specific quality-of-life questionnaire (P-QOL).

Results and limitations: At a mean follow-up of 12.5 mo, the anatomic cure rate for the apex was 98%. Anatomic failures elsewhere were mainly at the posterior compartment (18%). Subjective prolapse cure rate was 91.7%, and no patients required reoperation for recurrent prolapse. Symptoms of preoperative SI, urge incontinence, or constipation were cured in 43%, 46%, and 42% of patients, respectively. The rate of de novo SI was 7.3%. De novo constipation developed in 5% and de novo dyspareunia developed in 19%.

Conclusions: We demonstrated that LSC results in good anatomic outcome and subjective cure of prolapse symptoms at medium term. The posterior compartment was most vulnerable for recurrence.

Conclusions: We demonstrated that LSC results in good anatomic outcome and subjective cure of prolapse symptoms at medium term. The posterior compartment was most vulnerable for recurrence.
Prospectiv. Study, POP stade II,
  - *Fellow: n = 60 cases vs, senior-teacher, n= 30 cases*

Fellow senior + Pelvitrainer

5 Steps

30 cases: step 1-2

30 to 50 cases: steps 3-4

Last 10 cases: full procedure

Comparativ itmes :
  - Time
  - Score
  - morbidity
  - Result
Authors included randomised clinical trials comparing boxmodel trainers versus no training in surgical trainees with no prior laparoscopic experience.

16 trials (464 participants) provided data for meta-analysis of box training (248 participants) versus no supplementary training (216 participants).

All the 16 trials in this comparison used video trainers.
The meta-analysis showed that the time taken for task completion was significantly shorter in the box trainer group than the control group.

Compared with the control group, the box trainer group also had lower error score, better accuracy score, and better composite performance scores.

Laparoscopic box model training appears to improve technical skills compared with no training in trainees with no previous laparoscopic experience.
Canadian Agency for Drugs and Technologies in Health

Robot-Assisted Surgery Compared with Open Surgery and Laparoscopic Surgery: Clinical Effectiveness and Economic Analyses

Chuong Ho, MD
Eva Tsakonas, BA, MSc
Khai Tran, MSc, PhD
Karen Cimon
Melissa Severn, MISt
Monika Mierzwinski-Urban, BA, MLIS
Jacques Corcos, MD
Stephen Pautler, MD, FRCSC

September 2014

Adapted by:  Michael Fung-Kee-Fung  MBBS, FRCSC, MBA
             Nancy Jaworski  B.Comm, MHA
             Walter Gotlieb  MD, PhD

Adapted from
CADTH Technology Report
on Robot-Assisted Surgery, 2011
<table>
<thead>
<tr>
<th>Specialty</th>
<th>Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urology</td>
<td>• 24,700 new cases of prostate cancer diagnosed in Canada in 2008.</td>
</tr>
<tr>
<td></td>
<td>• 21.9% of patients &lt;60 years old will choose prostatectomy as initial treatment.</td>
</tr>
<tr>
<td>Gynecology</td>
<td>• 36,000 hysterectomies performed in Canada in 2007/08</td>
</tr>
<tr>
<td></td>
<td>• Hysterectomy is performed for several indications</td>
</tr>
<tr>
<td>Nephrology</td>
<td>• 5 year prevalence ((2005)): 48.2/100,000 male &amp; 31.8/100,000 female</td>
</tr>
<tr>
<td></td>
<td>• Surgery is the primary treatment for localized renal cell carcinoma</td>
</tr>
<tr>
<td>Cardiac Surgery</td>
<td>• An estimated 20,000 coronary artery bypass graft (CABG) surgeries were performed in Canada in 2000/01</td>
</tr>
</tbody>
</table>

Adapted from CADTH Technology Report on Robot-Assisted Surgery, 2011
# Radical / Total Hysterectomy

## Robot-Assisted vs. Laparoscopic

**Table 10: Hysterectomy Meta-analyses, RARH-RATH Compared with LRH-LTH**

<table>
<thead>
<tr>
<th>Study or sub-category</th>
<th>Robotic surgery</th>
<th>Laparoscopic surgery</th>
<th>WMD (random)</th>
<th>Weight</th>
<th>WMD (random)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sert</td>
<td>7</td>
<td>8</td>
<td>6.14</td>
<td>-59.00 (95% CI: -101.05, -15.95)</td>
<td></td>
</tr>
<tr>
<td>Bell</td>
<td>40</td>
<td>30</td>
<td>8.02</td>
<td>12.00 (95% CI: -5.41, 31.01)</td>
<td></td>
</tr>
<tr>
<td>Boggesee</td>
<td>103</td>
<td>81</td>
<td>8.43</td>
<td>-22.20 (95% CI: -32.47, -11.93)</td>
<td></td>
</tr>
<tr>
<td>Gehrig</td>
<td>49</td>
<td>32</td>
<td>8.00</td>
<td>-26.00 (95% CI: -43.81, -8.19)</td>
<td></td>
</tr>
<tr>
<td>Payne</td>
<td>100</td>
<td>82</td>
<td>8.55</td>
<td>27.00 (95% CI: 20.47, 33.53)</td>
<td></td>
</tr>
<tr>
<td>Veljovich</td>
<td>25</td>
<td>24</td>
<td>6.54</td>
<td>28.00 (95% CI: -11.74, 67.74)</td>
<td></td>
</tr>
<tr>
<td>Estape</td>
<td>32</td>
<td>20</td>
<td>7.47</td>
<td>12.00 (95% CI: -13.98, 37.98)</td>
<td></td>
</tr>
<tr>
<td>Nezhat</td>
<td>26</td>
<td>20</td>
<td>7.92</td>
<td>70.00 (95% CI: 50.27, 89.73)</td>
<td></td>
</tr>
<tr>
<td>Seaman</td>
<td>105</td>
<td>76</td>
<td>8.15</td>
<td>-45.00 (95% CI: -60.99, -29.01)</td>
<td></td>
</tr>
<tr>
<td>Sheshoua</td>
<td>24</td>
<td>17</td>
<td>8.19</td>
<td>20.10 (95% CI: 4.73, 35.43)</td>
<td></td>
</tr>
<tr>
<td>Cardenas-Gicochea</td>
<td>102</td>
<td>83</td>
<td>8.25</td>
<td>59.00 (95% CI: 44.89, 73.12)</td>
<td></td>
</tr>
<tr>
<td>Holtz</td>
<td>13</td>
<td>10</td>
<td>7.71</td>
<td>36.30 (95% CI: 5.50, 66.10)</td>
<td></td>
</tr>
<tr>
<td>Jung</td>
<td>28</td>
<td>22</td>
<td>7.31</td>
<td>27.98 (95% CI: -0.13, 56.09)</td>
<td></td>
</tr>
</tbody>
</table>

![Figure 28, operative time](image)

![Figure 29, hospital stay](image)

**Test for heterogeneity:** $Q = 27.36$, df = 16 (P = 0.002), $I^2 = 63.4\%$

**Test for overall effect:** $Z = 2.76$ (P = 0.008)
# Radical / Total Hysterectomy
## Robot-Assisted vs. Laparoscopic

## Table 10: Hysterectomy Meta-analyses, RARH-RATH Compared with LRH-LTH

<table>
<thead>
<tr>
<th>Study or sub-category</th>
<th>Robotic surgery n/N</th>
<th>Laparoscopic surgery n/N</th>
<th>RR (random) 95% CI</th>
<th>Weight %</th>
<th>RR (random) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bell</td>
<td>3/46</td>
<td>8/50</td>
<td>26.32</td>
<td>0.28 [0.08, 0.97]</td>
<td></td>
</tr>
<tr>
<td>Boggess</td>
<td>6/163</td>
<td>11/261</td>
<td>26.36</td>
<td>0.43 [0.17, 1.23]</td>
<td></td>
</tr>
<tr>
<td>Esperone</td>
<td>6/22</td>
<td>4/17</td>
<td>24.88</td>
<td>0.80 [0.26, 2.44]</td>
<td></td>
</tr>
<tr>
<td>Holz</td>
<td>2/13</td>
<td>3/20</td>
<td>11.50</td>
<td>1.03 [0.32, 3.33]</td>
<td></td>
</tr>
<tr>
<td>Jung</td>
<td>2/28</td>
<td>2/25</td>
<td>8.79</td>
<td>0.39 [0.14, 2.58]</td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>216</td>
<td>173</td>
<td>100.00</td>
<td>0.54 [0.31, 0.95]</td>
<td></td>
</tr>
</tbody>
</table>

Total events: 19 (Robotic surgery), 23 (Laparoscopic surgery)
Test for heterogeneity: Chi^2 = 2.82, df = 4, P = 0.62, I^2 = 0%
Test for overall effect: Z = 2.15 (P = 0.03)

## Figure 30, complication rate

## Figure 31, blood loss

<table>
<thead>
<tr>
<th>Study or sub-category</th>
<th>Robotic surgery N</th>
<th>Laparoscopic surgery N</th>
<th>WMD (random) 95% CI</th>
<th>Weight %</th>
<th>WMD (random) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spirtz</td>
<td>7</td>
<td>6</td>
<td>74.05 (-177.00)</td>
<td>1.87</td>
<td>-69.06 [-221.76, 83.67]</td>
</tr>
<tr>
<td>Bell</td>
<td>60</td>
<td>30</td>
<td>160.00 (252.30)</td>
<td>1.05</td>
<td>-67.00 [-255.30, 81.30]</td>
</tr>
<tr>
<td>Boggess</td>
<td>103</td>
<td>61</td>
<td>116.00 (-26.60)</td>
<td>20.78</td>
<td>-71.20 [-101.46, 58.12]</td>
</tr>
<tr>
<td>Gehring</td>
<td>49</td>
<td>32</td>
<td>150.00 (-6.00)</td>
<td>7.72</td>
<td>-100.00 [-158.13, -41.87]</td>
</tr>
<tr>
<td>Pflaster</td>
<td>100</td>
<td>100</td>
<td>113.00 (-182.00)</td>
<td>23.55</td>
<td>-51.00 [-79.09, -23.71]</td>
</tr>
<tr>
<td>Vittorio</td>
<td>25</td>
<td>17</td>
<td>75.00 (81.00)</td>
<td>3.97</td>
<td>-6.80 [-92.65, 75.85]</td>
</tr>
<tr>
<td>Esperone</td>
<td>22</td>
<td>20</td>
<td>209.00 (-62.00)</td>
<td>3.55</td>
<td>-19.40 [-170.14, 11.34]</td>
</tr>
<tr>
<td>Hahn</td>
<td>24</td>
<td>17</td>
<td>56.00 (334.00)</td>
<td>1.67</td>
<td>50.00 [-187.34, 87.24]</td>
</tr>
<tr>
<td>Shionoiri</td>
<td>101</td>
<td>173</td>
<td>197.00 (187.00)</td>
<td>19.11</td>
<td>-78.00 [-110.22, -45.78]</td>
</tr>
<tr>
<td>Holz</td>
<td>13</td>
<td>20</td>
<td>150.00 (-111.00)</td>
<td>9.42</td>
<td>-65.00 [-117.06, -13.74]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>521</td>
<td>559</td>
<td>100.00</td>
<td>-60.96 [-78.37, -43.54]</td>
<td></td>
</tr>
</tbody>
</table>

Total events: 19 (Robotic surgery), 23 (Laparoscopic surgery)
Test for heterogeneity: Chi^2 = 12.13, df = 10, P = 0.28, I^2 = 17.8%
Test for overall effect: Z = 0.88 (P < 0.00001)

## Figure 32, incidence of transfusion

<table>
<thead>
<tr>
<th>Study or sub-category</th>
<th>Robotic surgery n/N</th>
<th>Laparoscopic surgery n/N</th>
<th>RR (random) 95% CI</th>
<th>Weight %</th>
<th>RR (random) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ball</td>
<td>2/40</td>
<td>3/30</td>
<td>18.25</td>
<td>0.50 [0.09, 2.81]</td>
<td></td>
</tr>
<tr>
<td>Esperone</td>
<td>1/32</td>
<td>0/17</td>
<td>6.45</td>
<td>1.64 [0.07, 38.14]</td>
<td></td>
</tr>
<tr>
<td>Serruto</td>
<td>3/92</td>
<td>10/56</td>
<td>27.50</td>
<td>0.38 [0.05, 0.64]</td>
<td></td>
</tr>
<tr>
<td>Cardenas-Goicochea</td>
<td>3/132</td>
<td>3/132</td>
<td>20.56</td>
<td>1.70 [0.35, 8.25]</td>
<td></td>
</tr>
<tr>
<td>Jung</td>
<td>2/28</td>
<td>4/25</td>
<td>26.78</td>
<td>0.89 [0.25, 3.20]</td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>294</td>
<td>301</td>
<td>100.00</td>
<td>0.62 [0.26, 1.49]</td>
<td></td>
</tr>
</tbody>
</table>

Total events: 13 (Robotic surgery), 20 (Laparoscopic surgery)
Test for heterogeneity: Chi^2 = 5.88, df = 4 (P = 0.20), I^2 = 37.1%
Test for overall effect: Z = 1.07 (P = 0.20)
Economic Analysis
Economic Model: Base Case (Robot not donated)

- Robot-Assisted vs. Laparoscopic

Table 18: Average and Incremental Per-patient Costs of RARP and LRP

<table>
<thead>
<tr>
<th>Health Care Resource</th>
<th>RARP</th>
<th>LRP</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robotic equipment and accessories</td>
<td>$3,785</td>
<td>$0*</td>
<td>$3,785</td>
</tr>
<tr>
<td>Consumables and disposables</td>
<td>$2,542</td>
<td>$831</td>
<td>$1,711</td>
</tr>
<tr>
<td>Robot training course</td>
<td>$36</td>
<td>$0</td>
<td>$36</td>
</tr>
<tr>
<td>Robot maintenance contract</td>
<td>$1,064</td>
<td>$0</td>
<td>$1,064</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>$9,959</td>
<td>$11,888</td>
<td>$-1,929</td>
</tr>
<tr>
<td>Surgical fees</td>
<td>$1,381</td>
<td>$1,381</td>
<td>$0</td>
</tr>
<tr>
<td>Anesthesia</td>
<td>$581</td>
<td>$615</td>
<td>$24</td>
</tr>
<tr>
<td>Transfusion</td>
<td>$11</td>
<td>$20</td>
<td>$-9</td>
</tr>
<tr>
<td><strong>Total average costs</strong></td>
<td><strong>$19,360</strong></td>
<td><strong>$14,735</strong></td>
<td><strong>$4,625</strong></td>
</tr>
</tbody>
</table>

LRP = laparoscopic radical prostatectomy; RARP = robot-assisted radical prostatectomy. Based on average caseload of 130 patients per year, and equipment life of seven years.

*There is some equipment cost associated with laparoscopic surgery not accounted for by the consumables; however, this cost is not specific to prostatectomy, is allocated over many indications and procedures, and is likely to be small.
### Table 24: Hospital Budget Impact of Robotic Surgery Program, by Indication and Useful Life of Equipment

<table>
<thead>
<tr>
<th>Patient Population</th>
<th>Costs</th>
<th>Useful Life of Robotic Equipment</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Robot costs</td>
<td>5 Years</td>
</tr>
<tr>
<td>Average patient</td>
<td>$5,235,503</td>
<td>$6,264,505</td>
</tr>
<tr>
<td></td>
<td>Other surgical disposables</td>
<td>$344,866</td>
</tr>
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<td>Hospital stay savings</td>
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<td></td>
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<td>$3,246,641</td>
</tr>
<tr>
<td>Hysterectomy</td>
<td>Other surgical disposables</td>
<td>$204,505</td>
</tr>
<tr>
<td></td>
<td>Hospital stay savings</td>
<td>$2,955,069</td>
</tr>
<tr>
<td></td>
<td>Net program costs</td>
<td>$2,075,929</td>
</tr>
<tr>
<td>Cardiac surgery</td>
<td>Other surgical disposables</td>
<td>$141,992</td>
</tr>
<tr>
<td></td>
<td>Hospital stay savings</td>
<td>$3,716,066</td>
</tr>
<tr>
<td></td>
<td>Net program costs</td>
<td>$1,377,445</td>
</tr>
<tr>
<td>Nephrectomy</td>
<td>Other surgical disposables</td>
<td>$642,406</td>
</tr>
<tr>
<td></td>
<td>Hospital stay savings</td>
<td>$2,374,467</td>
</tr>
<tr>
<td></td>
<td>Net program costs</td>
<td>$2,218,631</td>
</tr>
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</table>

Assumption — average caseload of 130 patients per year. Per-patient savings for average patient and for each indication were estimated based on distribution of frequency of procedures, obtained from Minogue Medical Inc. (Danny Minogue, Minogue Medical Inc., Montreal, Quebec, Canada: personal communication, December 31, 2010) and the Canadian Institute for Health Information’s Discharge Abstract Database.
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ANATOMY OF THE PRESACRAL SPACE

STRUCTURES TO BE RESPECTED FOR A SAFE FIXATION OF THE MESH
Rate of blood transfusion
0.2%

Anatomical variations of the left common iliac vein/middle part promontory

- Distances between the left common iliac vein and the midsacral promontory:
  - Dissection of 52 cadavers
  - Mean of $d_1 = 27$ mm (9 - 52)
  - Mean of $d_2 = 22$ mm (9 - 35)

Wieslander CK. et al
Vascular anatomy of the presacral space in unembalmed female cadavers
American journal of obstetrics and gynecology 2006, 195: 1736
• Presacral vessels:
  - Middle sacral vein
    $\varnothing = 2\text{mm (1-4)}$
    double (80%)
    left to P= 33%
    right to P= 52%
    crossing P= 5%
    mean of $d3 = 7\text{ mm (0-17)}$

Wieslander CK. et al
Vascular anatomy of the presacral space in unembalmed female cadavers
American journal of obstetrics and gynecology
2006, 195: 1736
• Presacral vessels:
  - Middle sacral artery
    - Ø = 2mm (1-4)
    - Left to P = 62%
    - Right to P = 30%
    - Crossing P = 8%
    - Mean of d4 = 4 mm (0-15)

Wieslander CK. et al
Vascular anatomy of the presacral space in unembalmed female cadavers
American journal of obstetrics and gynecology 2006, 195: 1736
ANATOMICAL VARIATIONS OF PRESACRAL VESSELS / MIDDLE PART PROMONTORY

→ Dissection right to the medline = safer

- Presacral space: avascular areas
- Overlay of vascular structures
- (10 cadavers)

Flynn MK. et al
Vascular anatomy of the presacral space: a fresh tissue cadaver dissection
American journal of obstetrics and gynecology
2005, 192: 1501
• Distances between the right ureter and the midsacral promontory:

• Dissection of 10 cadavers

<table>
<thead>
<tr>
<th>Brad</th>
<th>Right ureter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>28 (7) [13-36]</td>
</tr>
<tr>
<td>B</td>
<td>32 (7) [22-42]</td>
</tr>
<tr>
<td>C</td>
<td>34 (7) [25-45]</td>
</tr>
</tbody>
</table>

Flynn MK. et al
Vascular anatomy of the presacral space: a fresh tissue cadaver dissection
American journal of obstetrics and gynecology
2005, 192: 1501
ANATOMICAL VARIATIONS
OF THE
SUPERIOR HYPOGASTRIC PLEXUS

- SHP: sympathetic plexus connected to IHP

Shiozawa T. et al
Nerve-preserving sacrocolpopexy: anatomical study and surgical approach
European journal of obstetrics and gynecology and reproductive biology, 2010, 152: 103
ANATOMICAL VARIATIONS OF SUPERIOR HYPOGASTRIC PLEXUS

- Right hypogastric nerve:
- Mean of $d6 = 7 \text{ mm} \ (0 - 17)$

Wieslander CK. et al
Vascular anatomy of the presacral space in unembalmed female cadavers
*American journal of obstetrics and gynecology 2006, 195: 1736*
Nerve-preserving sacrocolpopexy: anatomical study and surgical approach. Shiozawa T1 et al

By protecting the superior hypogastric plexus and the part of the presacral area below the promontory we can preserve the hypogastric nerves, the sacral and pelvic splanchnic nerves and thus the autonomic innervation of the pelvic organs
**ANATOMICAL VARIATIONS OF LVCA**

- Fixation into the anterior longitudinal ligament
• Fixation into the anterior longitudinal ligament and NOT into the disc
• Tackers go deep into the bone

Boukkerou M. et al
Promontofixation procedures: use of non-absorbable sutures or tackers?
Journal de gynécologie obstétrique et biologie de la reproduction
2003, 32: 54
Spondilithis 0,3%

– Prévention
  • Asepsie and per-op antibioprophylaxy

– Diagnosis :
  – Lombalgia, fever, tence, neurologic diseases
  – Inflammatory Syndrome (CRP)
  – Radiologic signs. (IRM)
  • Immobilisation
  • Antibiothérapie prolongée +/- ponction discale
  • Ablation des prothèses
  • +/- Arthrodèse, laminectomie
Posterior Dissection – DENONVILLIERS FASCIA

Since Charles-Pierre Denonvilliers first discovered the firm, membranous structure between the rectum and prostate or bladder in 1836, now called “Denonvilliers’ fascia” (DF), the origin of DF has remained controversial.
Based on the evidence, surgeons should be aware of variations and search for them to create a suitable dissection plane to avoid iatrogenic positive margins and rectal injury.
Rectal Injury
0.4 %

- **Sub-péritonéal rectum**
  - There is a recto-vaginal space
  - Horizontal Position ++
  - Close to the post face of the vagina on the distal points
  - Danger on the proximal part of the Recto-Vaginal Septum

- **Prévention**
  - Follow the post-face of the vagina
  - Systématic pre-operativ preparation
    - NORMACOL ®
  - Maleable Retractor

- **Treatment**
  - Immédiat Suture
  - **Mesh contra-Indication**
- Prévention
  - Ant Vaginal Length - 6 cm (4 – 7.5) *Jayle et al Masson 1918*
  - Post Vaginal Length - 9 cm (6.5 – 11.5) *Jayle et al Masson 1918*
  - There is no difference between the anterior and posterior vagina thickness
  - If the vagina is too thin – Plicature of the vagina

- Treatment
  - If Vagina Injury: Suture of the vagina
  - There is no contra indication to fix the meshes

Vaginal Injury

0.4 %
RISK OF URETERAL INJURY < 1/1000

— Prévention
  • Parietal Uretera
    — Cross between right extern iliac artery and uterine artery
  • Visceral Uretera
    — Behind the ligaments
    — Under the bladder
    — In contact with the bladder

— Treatment
  • Per-op:
    — Per-op Bleu carmin en IV
    — Uretéral Catheter
  • Post-op
    — Uro-scanner
    — JJ Ureteral
Ureter arriving in urinoma

Axial T2

Coronale T2
Bladder Injury
2 %

- **Sub-péritonéal Bladder**
  - Vertical Position ++
  - Close to the ant face of the vagina
  - There is NO space

- **Prévention**
  - Following the Ant- Face of the vagina
  - Maleable Retractor

- **Treatment**
  - Immédiat Suture
  - Mesh Indication
  - Bladder Catheterisation 5 days
Small and Large Bowel Injury

- Occur when adhesiolysis has to be undertaken
- Avoid distended bowel at surgery by 48 hours pre op bowel prep
- Avoid nitrous oxide during surgery as it causes bowel distension
- If small bowel injured
  - Repair laparoscopically
  - Mesh can still be placed
- Antibiotic cover for 7 days post op
CONCLUSION 1:

1. To open the peritoneum tigh-it
2. Dissection on the right side of the mid-sacral ligament
3. Repair carefully the vessels and the Right ureter
4. Try to preserve the right hypogastric nerve
5. Fix your needle 1 cm below the promontory
MESH SELECTION
PERTINENT MESH SCIENCE
WHY USE A CERTAIN MESH

Pr Bruno DEVAL*, MD,
Geoffroy Saint-Hilaire – Clinic *
Hotel – Dieu de Paris **
Paris V University
Increased fibrosis and deposits of **unorganized collagen** create an increased stiffness

- (Klinge, 1999)

Stiffness has been linked to clinical complications—heavier, stiffer meshes having higher complications

- (Dietz, 2003)

Stiffer meshes showed decreases in smooth muscle, collagen and structural proteins following implantation

- (Moalli, P. AUGS 2011)

Heavier stiffer meshes showed a greater propensity for stress shielding which in turn could cause reoccurrences of prolapse

- (Moalli, P. AUGS 2011)
“Implantation of the stiffest mesh in the non human primate resulted in an exhibition of a stress-shielding response manifested by inferior biomechanical properties of the abdominal and vaginal tissues. Less stiff meshes resulted in preservation of tissue properties.”

Wolff’s Law – remodeling of bone in response to stress
MESH CHARACTERISTICS

Density - Filament size – Elasticity - Pore size
Surface area – Overall “mesh load”

TO OBTAIN:

• Optimal tissue incorporation and collagen growth
• No erosion
• No palpable mesh to patient and her partner
• Vaginal elasticity

• Biomechanical engineers working with type-I polypropylene have focused on reducing overall “mesh load” while maintaining durability

So lighter is better!!!
WHAT KIND OF MESH?

- To date polypropylene meshes are the best type on the market
- Absorbable meshes do not work
- There is an evidence to use Polypropylene vs polyesther
- PTFE and NW meshes are contra – indicated in the POP Repair.
ULTRA- LIGHT POLYPROPYLENE

• Physiologically compatible 19 gsm\textsuperscript{1}
  • Ultra lightweight
  • Lowest weight available for pelvic restoration

• 1.8 millimeter macropores\textsuperscript{1}
  – Consistent size throughout the mesh

• 100 micron interstitial Smartpores\textsuperscript{TM, 1}
  – Simultaneously encourages both collagen growth and bacteria fighting properties
    • Fibroblasts will enter holes that are 50 to 200 microns in size\textsuperscript{2,3}
    • Macrophages and neutrophils will enter holes that are 50 to 120 microns in size\textsuperscript{2,3}
    • Reduce inflammation

---

1. Data on file
• Rates of Erosion and Exposure
  • Less than 1% erosion rate\textsuperscript{1}
  • Anterior exposure rate 1.7%\textsuperscript{2}
  • Posterior exposure rate 0.5%\textsuperscript{2}

• Greater tissue strength 3 months post-op – 71% more collagen growth\textsuperscript{3}

• Mature vaginal elastin decrease was not observed with Smartmesh\textsuperscript{4}

• Smartmesh did not induce a negative change in collagen metabolism\textsuperscript{5}

• Smartmesh had similar innervation density as sham\textsuperscript{6}

• Low incidence of de novo dyspareunia\textsuperscript{7}

PRE FORMED Y-MESH VS CUTTING MESH
AND MAKING IT TO FIT PATIENTS

Pr Bruno DEVAL*, MD,
Geoffroy Saint-Hilaire – Clinic *
Hotel – Dieu de Paris **
Paris V University
Mesh and operative handling

- The shape and weight of the mesh can help us during laparoscopic procedure
  - A large Y mesh is a good choice for vaginal vault shape
  - Better intra-operative manipulation and suturing
  - Lower mesh mass accommodates easy passage through narrow laparoscopic ports
Use re-absorbable sutures on the vagina

Avoid folding and wrinkling, the mesh must be well stretched

- Stitch erosions are reported
- Folding and wrinkling can cause erosions and dyspaurenia
DO WE NEED TO DISSECT POSTERIOR DOWN TO PERINEUM?
OR
IN WHICH PATIENTS THIS IS INDICATED?.

Pr Bruno DEVAL*, MD,
Geoffroy Saint-Hilaire – Clinic *
Hotel –Dieu de Paris **
Paris V University
Fix the mesh on the posterior vaginal wall and not on the elevator ani muscle

• To avoid dyschezia and chronic pelvic pain
Sacrocolpopexy should only be performed by board certified / eligible surgeons (Ob/Gyn or Urology)

Knowledge, surgical skills, and experience in reconstructive pelvic surgery
- FPMRS fellowship
- CME documentation
- Proctoring on 10 cases
- > 50% practice in reconstructive surgery

Outcomes and complications of should be monitored by annual internal audit

Informed consent should highlight
- Alternatives to ASC, including pessary
- Complications of ASC
- Complications of mesh

Source: www.augs.org
Conclusion

• The technique and expertise are fundamental.
• Laparoscopic colposacropexy can safely be offered to women with symptomatic POP
• Conventional LSCP = Open Way = robotic way
• Conventional LSCP > Vaginal Way