Surgical Therapy for BPH

Sexual Medicine Society of North America
Scottsdale, Arizona
2016

Jaspreet S. Sandhu, MD
Department of Surgery/Urology
Memorial Sloan Kettering Cancer Center

Dear Jaspreet S. Sandhu,

On behalf of William Brant, meeting chairman of the Sexual Medicine Society of North America, we would like to clarify the date and time of the event you are scheduled to present. The event will now be held on June 9, 2016 at 3:30 PM. If you fail to notify us by June 15, 2016 we will assign another speaker/moderator to replace you in the program.
Disclosures

• Boston Scientific - Consultant
Outline

• BPH/LUTS Management according to AUA Guidelines

• Simple Prostatectomy

• Electrosurgical Techniques and Variations

• Update on Laser Treatments

• General Endoscopic Surgical Considerations
American Urological Association Guideline: Management of Benign Prostatic Hyperplasia (BPH)

Panel Members:
Kevin T. McVary, MD (Chair)
Claus G. Roehrborn, MD (Co-Chair)
Andrew L. Avins, MD, MPH
Michael J. Barry, MD
Reginald C. Bruskewitz, MD
Robert F. Donnell, MD
Harris E. Foster, Jr., MD
Chris M. Gonzalez, MD
Steven A. Kaplan, MD
David F. Penson, MD
James C. Ulchaker, MD
John T. Wei, MD

Consultants:
Susan Norris, MD, MPH, MSc
Suzanne Pope, MBA
Natalie Jacuzzi, MPH
Tarra McNally, MA, MPH
Veronica Ivey
Ben Chan, MS
Diann Glickman, PharmD

AUA Staff:
Heddy Hubbard, PhD, MPH, FAAN
Cynthia Janus, MLS
Marni Zuckerman, MA
Michael Folmer
Kadiatu Kebe
Standard: Information on the benefits and harms of treatment alternatives for LUTS secondary to BPH should be explained to patients with moderate to severe symptoms (AUA-SI score ≥8) who are bothered enough to consider therapy. [Based on Panel consensus.]

Table 1.1. Treatment alternatives for patients with moderate to severe symptoms of BPH

<table>
<thead>
<tr>
<th>Watchful Waiting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medical Therapies</strong></td>
</tr>
<tr>
<td><strong>Alpha-Blockers</strong></td>
</tr>
<tr>
<td>- Alfuzosin</td>
</tr>
<tr>
<td>- Doxazosin</td>
</tr>
<tr>
<td>- Tamsulosin</td>
</tr>
<tr>
<td>- Terazosin</td>
</tr>
<tr>
<td>- Silodosin*</td>
</tr>
<tr>
<td><strong>5-Alpha-reductase inhibitors (5-ARIs)</strong></td>
</tr>
<tr>
<td>- Dutasteride</td>
</tr>
<tr>
<td>- Finasteride</td>
</tr>
<tr>
<td><strong>Combination Therapy</strong></td>
</tr>
<tr>
<td>- Alpha blocker and 5-alpha-reductase inhibitor</td>
</tr>
<tr>
<td>- Alpha blocker and anticholinergics</td>
</tr>
<tr>
<td><strong>Anticholinergic Agents</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Complementary and Alternative Medicines (CAM)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimally Invasive Therapies</strong></td>
</tr>
<tr>
<td>- Transurethral needle ablation (TUNA)</td>
</tr>
<tr>
<td>- Transurethral microwave thermotherapy (TUMT)</td>
</tr>
<tr>
<td><strong>Surgical Therapies</strong></td>
</tr>
<tr>
<td>- Open prostatectomy</td>
</tr>
<tr>
<td>- Transurethral holmium laser ablation of the prostate (HoLAP)</td>
</tr>
<tr>
<td>- Transurethral holmium laser enucleation of the prostate (HoLEP)</td>
</tr>
<tr>
<td>- Holmium laser resection of the prostate (HoLRP)</td>
</tr>
<tr>
<td>- Photoselective vaporization of the prostate (PVP)</td>
</tr>
<tr>
<td>- Transurethral incision of the prostate (TUIP)</td>
</tr>
<tr>
<td>- Transurethral vaporization of the prostate (TUVP)</td>
</tr>
<tr>
<td>- Transurethral resection of the prostate (TURP)</td>
</tr>
</tbody>
</table>

Recommendation: Surgery is recommended for patients who have renal insufficiency secondary to BPH, who have recurrent UTIs, bladder stones or gross hematuria due to BPH, and those who have LUTS refractory to other therapies. The presence of a bladder diverticulum is not an absolute indication for surgery unless associated with recurrent UTI or progressive bladder dysfunction.
Simple Prostatectomy

- Indications
  - Large glands (>80 grams)
  - Concomitant condition (e.g., Bladder stones, diverticula)
- Blood transfusions common
- Length of stay unacceptable given modern alternatives
- Significant decrease in volume of procedures done in the US
• 3000 patients
  – 361 octogenarians
  – Excellent results

  – Median LOS – 7 days
    • Decreased to 2-3 in recent cohort
  – 3.3% transfusion rate
  – Reoperation in 1% (29 patients)
    • All for post-op bleeding
Robot-assisted simple prostatectomy (RASP): does it make sense?

Deliu V. Matei*, Antonio Brescia*, Federica Mazzoleni, Matteo Spinelli*, Gennaro Musi, Sara Melegari, Giacomo Galasso, Serena Detti and Ottavio de Cobelli

Departments of Urology, IEO European Institute of Oncology and *Robotic Oncologic Urology Division, Saint Joseph Hospital, Milan, Italy

- 35 patients
- No blood transfusion
- Catheter time – 7.4 days
- Literature review: All reports of robot-assisted were better than open

**TABLE 3** Laparoscopic SP: data from published series

<table>
<thead>
<tr>
<th>Reference, year</th>
<th>Study type</th>
<th>No. of patients</th>
<th>Mean (sd):</th>
<th>Transfusion rate, %</th>
<th>Volume, mL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Operative duration, Δ min</td>
<td>Hospitalisation, Δ days</td>
<td>Catheterization, Δ days</td>
</tr>
<tr>
<td>Van Velthoven et al. 2003 [24]</td>
<td>Pilot</td>
<td>18</td>
<td>145 (32.5)</td>
<td>5.9 (5.5)</td>
<td>3 (2); 77%</td>
</tr>
<tr>
<td>Rey et al. 2004 [25]</td>
<td>Pilot</td>
<td>5</td>
<td>95</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Sotelo et al. 2005 [26]</td>
<td>Pilot</td>
<td>17</td>
<td>156 (8.37)</td>
<td>2 (1.1)</td>
<td>6.3 (1.3)</td>
</tr>
<tr>
<td>Rehman et al. 2005 [27]</td>
<td>Pilot</td>
<td>&gt;20</td>
<td>180</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Porpiglia et al. 2006 [28]</td>
<td>Prosp. Open</td>
<td>20</td>
<td>107.2 (34.9)</td>
<td>7.8 (4.1)</td>
<td>6.13 (3.7)</td>
</tr>
<tr>
<td>Mariano et al. 2006 [29]</td>
<td>Prosp. Open</td>
<td>60</td>
<td>138.48 (23.4)</td>
<td>3.46 (0.98)</td>
<td>4.6 (1.2)</td>
</tr>
<tr>
<td>Baumert et al. 2006 [18]</td>
<td>Retros. Open</td>
<td>30</td>
<td>115 (30)</td>
<td>5.1 (1.8)</td>
<td>4 (1.7)</td>
</tr>
<tr>
<td>Peltier et al. 2006 [31]</td>
<td>Prosp. Open</td>
<td>51</td>
<td>149</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Hoepfner et al. 2007 [32]</td>
<td>Retros. Open</td>
<td>100</td>
<td>66.34</td>
<td>4.3</td>
<td>3.17</td>
</tr>
<tr>
<td>Massaud et al. 2007 [33]</td>
<td>Retros. Open</td>
<td>20</td>
<td>109</td>
<td>4.9</td>
<td>3.6</td>
</tr>
<tr>
<td>McCullogh et al. 2009 [19]</td>
<td>Prosp. Open</td>
<td>96</td>
<td>95.1 (32.9)</td>
<td>6.3 (1.9)</td>
<td>5.2 (2.6)</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td></td>
<td></td>
<td>122</td>
<td>4.78</td>
<td>3.52</td>
</tr>
</tbody>
</table>

Retros, retrospective; Prosp., prospective.

**FIG. 1. Number of published papers/year: laparoscopic vs RA.**

Memorial Sloan Kettering Cancer Center
Robot Versus Open Simple Prostatectomy

- National Inpatient Sample from 1998-2010
  - 34,000 open versus 193 MIS
  - Annual number of SP decreased from 3157 cases in 1998 to 2227 in 2010
  - Transfusion prevalence in open was 21%

Parsons JK, Rangarajan SS, Palazzi K, Chang D., A National, Comparative Analysis of Perioperative Outcomes of Open and Minimally Invasive Simple Prostatectomy., J Endo 2015 (epub ahead of print)
Open (Simple) Prostatectomy - Summary

• Decreasing number of procedures being performed
  – Miniscule amount of MIS

• High blood transfusion rates

• High length of stay and catheter time

• Excellent functional results

• Durable

• Still considered a major inpatient operative procedure
Transurethral Resection of the Prostate

- Considered “Gold Standard”
- Multiple Variations
  - TUVP
  - Saline Bipolar TURP
- Excellent Results for years
TURP Considerations

TRANSCUTANEOUS RESECTION OF THE PROSTATE AMONG MEDICARE BENEFICIARIES: 1984 TO 1997


Procedure Rate/1000

0 5 10 15 20 25 30 35

Procedure Rate/1000

Memorial Sloan Kettering Cancer Center
The changing practice of transurethral prostatectomy: a comparison of cases performed in 1990 and 2000


JR Wilson, GH Urwin, MJ Stower

*Results:* There was a decline in the number of TURPs performed over the 10-year period, with more being carried out because of urinary retention. In 2000, the patient was older and the operative procedure took statistically longer than 10-years earlier, but the weight of prostate tissue resected, patient satisfaction and complication rates were similar.
Examining the ‘gold standard’: a comparative critical analysis of three consecutive decades of monopolar transurethral resection of the prostate (TURP) outcomes

Erik K. Mayer, Stephanie G.C. Kroeze*, Samarth Chopra†, Alex Bottle† and Anup Patel
Department of Urology, St Mary’s Hospital, Imperial College Healthcare NHS Trust, London, UK, †Department of Urology, University Medical Center Utrecht, Utrecht, the Netherlands, †Department of Urology, St Vincent’s Hospital, Sydney, Australia, and †Division of Epidemiology, Public Health and Primary Care, Imperial College London, London, UK
Accepted for publication 18 January 2012

FIG. 1. Summary of year of publication for the extracted articles.

TABLE 3 Comparison of transfusion rate, TUR syndrome, UTI, postoperative urinary retention/failure to void, among the three studies [6–7]

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfusion rate, %</td>
<td>4.4</td>
<td>0.4%</td>
<td>6.4</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Standardised residual</td>
<td>-1.8</td>
<td>-4.9</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>TUR syndrome, %</td>
<td>1.8</td>
<td>0.8</td>
<td>2</td>
<td>0.14</td>
</tr>
<tr>
<td>Standardised residual</td>
<td>0.0</td>
<td>-1.8</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>UTI rate, %</td>
<td>7.9</td>
<td>6.2</td>
<td>2.3</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Standardised residual</td>
<td>6.5</td>
<td>3.2</td>
<td>-4.1</td>
<td></td>
</tr>
<tr>
<td>Postoperative urinary retention/failure to void, %</td>
<td>6.8</td>
<td>7.1</td>
<td>6.5</td>
<td>0.85</td>
</tr>
<tr>
<td>Standardised residual</td>
<td>0.2</td>
<td>0.4</td>
<td>-0.3</td>
<td></td>
</tr>
</tbody>
</table>

n/r, not reported.

- Monopolar TURP is being used on larger prostates
- 4.4 % transfusion rate
- ? Medical therapy causing delay in surgical treatment
Monopolar versus Bipolar

- Bipolar Transurethral Resection of the Prostate uses a bipolar electrode in saline irrigant media for resecting
- Similar results in functional outcomes with possible decreased complication rates

A Systematic Review and Meta-analysis of Functional Outcomes and Complications Following Transurethral Procedures for Lower Urinary Tract Symptoms Resulting from Benign Prostatic Obstruction: An Update

Jean-Nicolas Cornu a,*, Sascha Ahyai b, Alexander Bachmann c, Jean de la Rosette d, Peter Gilling e, Christian Gratzek f, Kevin McVary g, Giacomo Novara h, Henry Woo i, Stephan Madersbacher j

K. Study or Subgroup | B-TURP Events | M-TURP Events | Weight | Odds Ratio M-H, Fixed, 95% CI | Odds Ratio M-H, Fixed, 95% CI
---|---|---|---|---|---
Akman et al | 127 | 0 | 2 | 130 | 10.2% 0.20 [0.01, 4.28] | 10.2% 0.20 [0.01, 4.28]
Autrervo et al | 48 | 0 | 2 | 52 | 9.8% 0.21 [0.01, 4.45] | 9.8% 0.21 [0.01, 4.45]
Erturhan et al | 120 | 0 | 2 | 120 | 10.3% 0.20 [0.01, 4.14] | 10.3% 0.20 [0.01, 4.14]
Geerdte et al | 170 | 0 | 3 | 170 | 14.4% 0.11 [0.02, 6.74] | 14.4% 0.11 [0.02, 6.74]
Giulianelli et al | 80 | 0 | 2 | 80 | 10.3% 0.20 [0.01, 4.13] | 10.3% 0.20 [0.01, 4.13]
Ho et al | 48 | 0 | 2 | 52 | 9.8% 0.21 [0.01, 4.45] | 9.8% 0.21 [0.01, 4.45]
Iori et al | 48 | 0 | 2 | 52 | 9.8% 0.21 [0.01, 4.45] | 9.8% 0.21 [0.01, 4.45]
Kim et al | 25 | 0 | 0 | 25 | Not estimable | Not estimable
Kong et al | 51 | 0 | 0 | 51 | Not estimable | Not estimable
Kumar et al | 57 | 1 | 60 | 6.0% 0.38 [0.18, 8.64] | 6.0% 0.38 [0.18, 8.64]
Mamoulakis et al | 141 | 1 | 139 | 6.2% 0.33 [0.03, 8.06] | 6.2% 0.33 [0.03, 8.06]
Mendez-Probst et al | 22 | 0 | 21 | Not estimable | Not estimable
Michelisen et al | 118 | 1 | 120 | 6.1% 0.34 [0.18, 8.54] | 6.1% 0.34 [0.18, 8.54]
Nugolo et al | 29 | 0 | 30 | Not estimable | Not estimable
Patavnik et al | 53 | 0 | 2 | 51 | 10.4% 0.39 [0.18, 8.95] | 10.4% 0.39 [0.18, 8.95]
Singh et al | 30 | 0 | 30 | Not estimable | Not estimable
Singhania et al | 30 | 0 | 30 | Not estimable | Not estimable
Xie et al | 110 | 0 | 2 | 110 | 10.3% 0.20 [0.01, 4.14] | 10.3% 0.20 [0.01, 4.14]
Yang et al | 56 | 1 | 59 | 6.1% 0.33 [0.01, 8.38] | 6.1% 0.33 [0.01, 8.38]
Total (95% CI) | 1329 | 1329 | 100.0% | 0.22 [0.09, 0.55] | 0.22 [0.09, 0.55]

Total events | 0 | 19 | |

Heterogeneity: $\chi^2 = 3.31$, df = 10 ($p = 0.90$); $I^2 = 0$
Test for overall effect: $Z = 3.17$ ($p = 0.002$)

M. Study or Subgroup | B-TURP Mean | SD | Total | M-TURP Mean | SD | Total | Mean Difference IV, Fixed, 95% CI | Mean Difference IV, Fixed, 95% CI
---|---|---|---|---|---|---|---|---
Akman et al | 10.3 | 3 | 127 | 10.8 | 2 | 130 | 9.4% | -0.50 [-1.22, 0.22] | -0.50 [-1.22, 0.22]
Chen et al | 4.2 | 2 | 60 | 4.1 | 2 | 50 | 5.3% | 0.0 [0.0, 0.66] | 0.0 [0.0, 0.66]
Erturhan et al | 4 | 0 | 2 | 120 | 4 | 2 | 120 | 19.2% | 0.00 [0.0, 0.51] | 0.00 [0.0, 0.51]
Iori et al | 7.1 | 0 | 7 | 6.7 | 4 | 26 | 1.8% | 0.30 [-1.37, 1.97] | 0.30 [-1.37, 1.97]
Kumar et al | 6.94 | 1.25 | 57 | 7.07 | 1.22 | 60 | 24.5% | -0.13 [-0.58, 0.32] | -0.13 [-0.58, 0.32]
Mamoulakis et al | 7.7 | 0 | 4 | 88 | 7.5 | 4 | 73 | 2.8% | 0.20 [-1.16, 1.56] | 0.20 [-1.16, 1.56]
Nuhoglu et al | 5.4 | 0 | 5 | 3.7 | 2.4 | 3 | 26 | 1.3% | 0.20 [-1.72, 2.12] | 0.20 [-1.72, 2.12]
Sackier et al | 4 | 0 | 8 | 4.1 | 2 | 3 | 26 | 1.1% | 0.40 [-1.68, 2.48] | 0.40 [-1.68, 2.48]
Singhania et al | 6.13 | 0.94 | 30 | 6.23 | 0.94 | 30 | 21.7% | -0.10 [-0.58, 0.38] | -0.10 [-0.58, 0.38]
Xie et al | 6.5 | 2.03 | 110 | 6.79 | 2.59 | 110 | 13.0% | 0.29 [-0.90, 0.32] | 0.29 [-0.90, 0.32]

Total (95% CI) | 656 | 646 | 100.0% | -0.12 [-0.34, 0.11] | -0.12 [-0.34, 0.11]

Heterogeneity: $\chi^2 = 2.56$, df = 9 ($p = 0.98$); $I^2 = 0$
Test for overall effect: $Z = 1.02$ ($p = 0.31$)

IPSS

**Similar functional outcomes, but little long term data for Bipolar TURP**
Bipolar Vaporization of the Prostate – “Button”

- Combines bipolar technology with ablative technique
- Appears effective, but questionable long-term results
- Recent rapid review by Canadian Agency for Drugs and Technologies in Health - little medium to long-term data available
Transurethral Resection of the Prostate - Summary

• Multiple modalities now available

• All have problem with decreasing number of procedures being performed
  – Medical education issues

• Bipolar may be safer than monopolar

• Long-term functional outcomes with bipolar vaporization techniques unclear
  – A few centers dominate published literature
Laser Therapies

Option: Transurethral laser enucleation (holmium laser resection of the prostate [HoLRP], holmium laser enucleation of the prostate [HoLEP]), transurethral side firing laser ablation (holmium laser ablation of the prostate [HoLAP], and photoselective vaporization [PVP]) are appropriate and effective treatment alternatives to transurethral resection of the prostate and open prostatectomy in men with moderate to severe LUTS and/or those who are significantly bothered by these symptoms. The choice of approach should be based on the patient’s presentation, anatomy, the surgeon’s level of training and experience, and a discussion of the potential benefit and risks for complications. Generally, transurethral laser approaches have been associated with shorter catheterization time and length of stay, with comparable improvements in LUTS. There is a decreased risk of the perioperative complication of transurethral resection syndrome. Information concerning certain outcomes, including retreatment and urethral strictures, is limited due to short follow-up. As with all new devices, comparison of outcomes between studies should be considered cautiously given the rapid evolution in technologies and power levels. Emerging evidence suggests a possible role of transurethral enucleation and laser vaporization as options for men with very large prostates (> 100 g). There are insufficient data on which to base comments on bleeding.
Holmium Laser Enucleation of the Prostate

- Conceptually similar to simple prostatectomy
  - Incision to adenoma made with laser
  - Cystoscopy used to separate adenoma from capsule with laser used for hemostasis

- Excellent long-term data available
  - Unfortunately, reports concentrated from a few centers

- Difficult procedure to master
HoLEP versus Open Prostatectomy

HoLEP Group Had
- Longer operating time (136 vs 91 minutes)
- Less blood loss (↓ Hb, 1.9 vs 2.8 g/dL)
- Shorter catheterization time (31 vs 194 hours)
- Shorter hospital stay (70 vs 251 days)
- No blood transfusions (vs 8 (13%))

HoLEP versus TURP

AUA Symptom Score

<table>
<thead>
<tr>
<th>Complication</th>
<th>HoLEP</th>
<th>TURP</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urethral stricture</td>
<td>4 (4.1%)</td>
<td>3 (3.3%)</td>
<td>1.0</td>
</tr>
<tr>
<td>Bladder-neck contracture</td>
<td>3 (3.1%)</td>
<td>3 (3.3%)</td>
<td>1.0</td>
</tr>
<tr>
<td>BPH recurrence</td>
<td>1 (1.0%)</td>
<td>0 (0%)</td>
<td>1.0</td>
</tr>
<tr>
<td>Total no. (%)</td>
<td>8 (8.2%)</td>
<td>6 (6.6%)</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Maximum Flow Rate

PVR

A Systematic Review and Meta-analysis of Functional Outcomes and Complications Following Transurethral Procedures for Lower Urinary Tract Symptoms Resulting from Benign Prostatic Obstruction: An Update

Jean-Nicolas Cornu a,*, Sascha Ahayai b, Alexander Bachmann c, Jean de la Rosette d, Peter Gilling e, Christian Gratzke f, Kevin McVary g, Gaetano Novara h, Henry Woo i, Stephan Madersbacher j

IPSS

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>HoLEP</th>
<th>M-TURP</th>
<th>Mean Difference</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Total</td>
<td>Mean</td>
</tr>
<tr>
<td>Ahayai 2007</td>
<td>1.7</td>
<td>1.8</td>
<td>89</td>
<td>3.9</td>
</tr>
<tr>
<td>Eiltabey 2010</td>
<td>2.2</td>
<td>1.4</td>
<td>40</td>
<td>3.7</td>
</tr>
<tr>
<td>Gilling 2012</td>
<td>4.3</td>
<td>0.7</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>Gupta 2006</td>
<td>5.2</td>
<td>0.17</td>
<td>50</td>
<td>5.6</td>
</tr>
<tr>
<td>Montorsi 2008</td>
<td>4.1</td>
<td>2.3</td>
<td>52</td>
<td>3.9</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>256</td>
<td></td>
<td>100.0%</td>
<td>251</td>
</tr>
<tr>
<td>Heterogeneity: $\tau^2 = 0.34$; $\chi^2 = 27.46$, df = 4 ($p &lt; 0.0001$); $I^2 = 85%$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: $Z = 3.01$ ($p = 0.003$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

• HoLEP results in durable improvement in IPSS
A Systematic Review and Meta-analysis of Functional Outcomes and Complications Following Transurethral Procedures for Lower Urinary Tract Symptoms Resulting from Benign Prostatic Obstruction: An Update

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Catheter Duration

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>HoLEP Mean</th>
<th>SD</th>
<th>Total</th>
<th>M-TURP Mean</th>
<th>SD</th>
<th>Total</th>
<th>Weight</th>
<th>Mean Difference IV, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahyai 2007</td>
<td>2.22</td>
<td>0.66</td>
<td>100</td>
<td>3.57</td>
<td>1.63</td>
<td>100</td>
<td>25.7%</td>
<td>-1.35 [-1.69, -1.01]</td>
</tr>
<tr>
<td>Eltabey 2010</td>
<td>2.6</td>
<td>1.2</td>
<td>40</td>
<td>3.8</td>
<td>1.6</td>
<td>40</td>
<td>17.6%</td>
<td>-1.20 [-1.82, -0.58]</td>
</tr>
<tr>
<td>Gilling 2012</td>
<td>2.3</td>
<td>0.23</td>
<td>30</td>
<td>4.1</td>
<td>0.47</td>
<td>30</td>
<td>30.1%</td>
<td>-1.80 [-1.99, -1.61]</td>
</tr>
<tr>
<td>Montorsi 2008</td>
<td>2.45</td>
<td>0.82</td>
<td>52</td>
<td>3.57</td>
<td>0.79</td>
<td>48</td>
<td>26.6%</td>
<td>-1.12 [-1.44, -0.80]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>222</td>
<td></td>
<td>218</td>
<td>100.0%</td>
<td></td>
<td></td>
<td></td>
<td>-1.40 [-1.78, -1.01]</td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.12; χ² = 16.49, df = 3 (p = 0.0009); I² = 82%
Test for overall effect: Z = 7.43 (p < 0.00001)

Length of Stay

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>HoLEP Events</th>
<th>Total</th>
<th>M-TURP Events</th>
<th>Total</th>
<th>Weight</th>
<th>Odds Ratio M-H, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eltabey 2010</td>
<td>10</td>
<td>40</td>
<td>8</td>
<td>40</td>
<td>32.7%</td>
<td>1.33 [0.46, 3.83]</td>
</tr>
<tr>
<td>Gupta 2006</td>
<td>5</td>
<td>50</td>
<td>1</td>
<td>50</td>
<td>16.3%</td>
<td>5.44 [0.61, 48.40]</td>
</tr>
<tr>
<td>Mavuduru 2009</td>
<td>1</td>
<td>15</td>
<td>3</td>
<td>15</td>
<td>14.4%</td>
<td>0.29 [0.03, 3.12]</td>
</tr>
<tr>
<td>Montorsi 2008</td>
<td>33</td>
<td>52</td>
<td>13</td>
<td>48</td>
<td>36.6%</td>
<td>4.68 [2.00, 10.95]</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>157</td>
<td></td>
<td>153</td>
<td></td>
<td>100.0%</td>
<td>2.12 [0.71, 6.33]</td>
</tr>
</tbody>
</table>

Total events: 49 25
Heterogeneity: Tau² = 0.06; χ² = 7.09, df = 3 (p = 0.07); I² = 58%
Test for overall effect: Z = 1.35 (p = 0.18)

- HoLEP results in decreased catheter duration, but similar LOS
Holmium Laser Enucleation - Summary

• Long-term results excellent if done in good hands

• Technique difficult to master

• Morcelator needed in addition to standard laser equipment
  – Act of morcelation results in additional operative time and morbidity

• Functional results comparable or better than TURP or simple prostatectomy
GreenLight Laser Vaporization of the Prostate

- **High Power**
  - Evolving: original 60W – GreenLight PV system (80W) – GreenLight HPS system (120W) – GreenLight XPS system (180W)

- Coagulation zone depth of 1-2 mm with side-firing optical fiber in non-contact mode
  - Hemostasis ideal with this depth of coagulation

- Long-term outcomes data available for 80-180W from multiple centers
  - Appears safer than other modalities

- Simulator introduced to flatten learning curve

- Recent randomized trial comparing 180W (XPS) to TURP
A European Multicenter Randomized Noninferiority Trial Comparing 180 W GreenLight XPS Laser Vaporization and Transurethral Resection of the Prostate for the Treatment of Benign Prostatic Obstruction: 12-Month Results of the GOLIATH Study

Alexander Bachmann,*† Andrea Tubaro,*† Neil Barber,*† Frank d’Ancona,*† Ulrich Witzsch,*† Marc-Oliver Grimm,*† Joan Benejam,*† Jens-Uwe Stolzenburg,*† Sascha Pahernik,*† Herman Roelink,*† Filip Ameye,* Christiaan Franck Bruyère,* Wolfgang Loidl,* Tim Larner,*† Nirjan-Kumar Gogoi,* Richard Rolf Muschler,* Andrew Thorpe,* Nimit Shrotri,* Stuart Graham,* Moritz Hamal,* Martin Schostak,* Carlos Capitán,* Helmut Knispel† and J. Andrew Thomas,*†

THE JOURNAL OF UROLOGY®
Vol. 193, 570-578, February 2015

- 139 XPS v/s 142 TURP
- Multicenter
- 130 v/s 126 available at 12 months

Figure 1. CONSORT (Consolidated Standards of Reporting Trials) diagram depicting patient allocation and follow-up. XPS, GL-XPS.
Figure 4. Kaplan-Meier curves for study defined complications and Clavien-Dindo grade IIIa and IIIb adverse events. A, proportion of patients remaining free of any study defined complication. B, proportion of patients without Clavien-Dindo IIIa AE. C, proportion of patients without Clavien-Dindo IIIb AE.

Figure 6. Surgical or invasive intervention arising from AEs. Kaplan-Meier plot time to reintervention shown as proportion of patients in each arm remaining intervention-free during first year. Since each man may have undergone multiple interventions, time is number of days from operation to AE requiring intervention.
Conclusion from GOLIATH study

• TURP resulted in 5 times more surgical interventions to resolve post-operative bleeding than GreenLight XPS procedure

• Comparable results in terms of IPSS, Qmax, and complication-free after 12 months

• Patients treated with the GreenLight XPS system had a significantly shorter median length of catheterization, time until stable health, and hospitalization compared with TURP

• Comparable storage symptoms (dysuric or irritative symptoms) between treatment arms

• Overall post-operative re-intervention rates were not significantly different between treatment arms
120W versus 180W GreenLight™ System

GreenLight XPS 180W vs HPS 120W Laser Therapy for Benign Prostate Hyperplasia: A Prospective Comparative Analysis After 200 Cases in a Single-center Study

Tal Ben-Zvi, Pierre-Alain Hueber, Daniel Liberman, Roger Valdivieso, and Kevin C. Zorn

Safety, efficacy and outcomes of the new GreenLight XPS 180W laser system compared to the GreenLight HPS 120W system for the treatment of benign prostatic hyperplasia in a prospective nonrandomized single-centre study

Alper Eken, MD, FEBU; Bulent Soyupak, MD; Meltem Acil, MD; Taner Arpaci, MD; Tugana Akbas, MD

A Systematic Review of Experience of 180W XPS GreenLight Laser Vaportization of the Prostate in 1640 men.

Running title: BPH treatment with the 180W GreenLight laser

C. Brunken, C. Seitz and H.H. Woo

• All report decreased operative times, increased tissue removal, decreased fiber usage with no change in complication rates
GreenLight Laser Summary

• Technique evolved to current state

• Safety better than TURP
  – Anticoagulated patients
  – High-risk patients

• Functional outcomes similar to TURP

• Decreased catheter time and length of stay
  – Possible as outpatient

• Improvements in training make it easier to learn
  – Simulator
Other Lasers (available in the US)

• Thulium
  – Similar to Holmium
  – Enucleation and Ablation techniques

• Diode
  – Office-based
  – Deeper penetration, therefore similar to VLAP
Prostatic Urethral Lift

• Easy to perform
  – Multiple implants to desired effect

• No tissue ablation/resection

• No significant adverse events

• Long-term data needed
Other Upcoming Techniques

• Rezum Connective Ablation

• Aquabeam
  – Phase 1 data presented at AUA 2015

• Prostate Artery Emobolization

• ? Stents
Endoscopic Surgical Considerations
Recent Trends in Endoscopic Management

Contemporary Practice Patterns of Endoscopic Surgical Management for Benign Prostatic Hyperplasia Among Urologists in the United States

William T. Lowrance,*,† Andrew Southwick, Alexandra C. Maschino and Jaspreet S. Sandhu‡

*From the Department of Surgery, Urology Division, Huntsman Cancer Institute, University of Utah (WTL, AS), Salt Lake City, †Department of Epidemiology and Biostatistics (ACM) and Urology Service, Department of Surgery (WSS), Memorial Sloan-Kettering Center and Department of Urology, Weill Medical College of Cornell University (JS), New York, New York

Table 2. Endoscopic procedures for BPH by year of urologist certification or recertification

<table>
<thead>
<tr>
<th>Yr</th>
<th>No. Urologists Performing BPH Procedures</th>
<th>No. Electrosurgical TURP (%)</th>
<th>No. LP (%)</th>
<th>Total No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>493</td>
<td>7,116 (89)</td>
<td>906 (11)</td>
<td>8,022</td>
</tr>
<tr>
<td>2005</td>
<td>494</td>
<td>6,612 (85)</td>
<td>1,152 (15)</td>
<td>7,764</td>
</tr>
<tr>
<td>2006</td>
<td>588</td>
<td>6,816 (72)</td>
<td>2,660 (28)</td>
<td>9,476</td>
</tr>
<tr>
<td>2007</td>
<td>574</td>
<td>5,810 (60)</td>
<td>3,836 (40)</td>
<td>9,646</td>
</tr>
<tr>
<td>2008</td>
<td>565</td>
<td>5,296 (56)</td>
<td>4,114 (44)</td>
<td>9,410</td>
</tr>
<tr>
<td>2009</td>
<td>595</td>
<td>5,716 (54)</td>
<td>4,812 (46)</td>
<td>10,528</td>
</tr>
<tr>
<td>2010</td>
<td>646</td>
<td>6,858 (56)</td>
<td>5,338 (44)</td>
<td>12,196</td>
</tr>
<tr>
<td>Totals</td>
<td>3,955</td>
<td>44,224 (66)</td>
<td>22,818 (34)</td>
<td>67,042</td>
</tr>
</tbody>
</table>

Figure 2. Percentage of endoscopic BPH procedures performed as electrosurgical TURP (CPT 52601, 52612 or 52614) (solid curve) and LP (CPT 52648 or CPT 52649) (dashed line) by year of urologist (re)certification.

- TURP (and TURP like) procedures started to increase in the mid 2000’s
Clinically Significant Prostate Cancer is Rarely Missed by Ablative Procedures of the Prostate in Men with Prostate Specific Antigen Less Than 4 ng/ml

Joshua J. Meeks, Alexandra C. Maschino, Kevin T. McVary* and Jaspreet S. Sandhu†,

From the Urology Service, Department of Surgery (LJM, JSS) and Department of Biostatistics and Epidemiology (ACM), Memorial Sloan-Kettering Cancer Center, New York, New York, and Department of Urology, Feinberg School of Medicine, Northwestern University (KTM), Chicago, Illinois

Table 2. Estimated number of laser and transurethral resections of prostate procedures in United States from 2004 to 2006 and clinically significant prostate cancers missed by laser ablation

<table>
<thead>
<tr>
<th>Procedure</th>
<th>No. 2004</th>
<th>No. 2005</th>
<th>No. 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedures</td>
<td>69,538</td>
<td>69,839</td>
<td>70,140</td>
</tr>
<tr>
<td>TURP (%)</td>
<td>55,406</td>
<td>(80)</td>
<td>49,863</td>
</tr>
<tr>
<td>Laser (%)</td>
<td>14,132</td>
<td>(20)</td>
<td>20,156</td>
</tr>
<tr>
<td>TURP identifying clinically significant Ca (%)</td>
<td>31 (0.22)</td>
<td>58 (0.29)</td>
<td>74 (0.28)</td>
</tr>
</tbody>
</table>

Kaplan-Meier disease specific survival probability in 71,829 men by stage T1a, T1b and T1c between 2004 and 2006

- In properly screened patients, risk of missing clinically significant prostate cancer with ablative procedures is 0.3%
Summary

• Multiple options available for surgical management of BPH/LUTS

• MIST making a comeback with multiple new modalities now FDA approved

• Higher risk patients presenting for surgical management

• Education/training continues to be an issue

• New AUA guidelines available soon
Thank You