Surgical Treatment of BPH
Different Modalities and Recent Advances

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Indications for surgery

- Failure of medical treatment
- Refractory urinary retention
- Recurrent urinary tract infections due to prostatic hypertrophy
- Recurrent gross hematuria
- Renal insufficiency secondary to bladder outlet obstruction
- Bladder calculi
Open prostatectomy

- Enucleation of a hyperplastic prostatic adenoma

- Suprapubic (Fuller 1894)

- Retropubic (Millin 1945)

- Laparoscopic (2002)
Open prostatectomy

- Very effective for symptomatic relief
- Potential morbidities and complications
- Long hospital stay
Open prostatectomy

- Huge prostate
- BPH with
  - Large bladder stone
  - Bladder diverticula
TURP

- Gold standard for the past 30 years
TURP

- Morbidity 18% and mortality 0.2%
  - Bleeding/clot retention
  - Infection
  - Urethral stricture
  - Incontinence
  - Retrograde ejaculation
  - Erectile dysfunction
  - TUR syndrome
  - Injury to bladder/ureteral orifices
Improve the safety of surgery

- Modification of TURP
- Laser procedures
- Less invasive alternatives
Modifications of TURP

- **TUIP**
  - Collings knife
  - Incision at the 5 and 7 o'clock positions
  - Distal to the ureteral orifice to just proximal to the verumontanum
TUIMP-results

- Shorter operative time
- Shorter duration of catheterization
- Less retrograde ejaculation
- Good for small prostate <30gms
- Less effective than TURP
Modifications of TURP

- Vaporization (TUEVP)
  - First described Kaplan and Te (1995)
  - Effects of vaporization + dessication
  - 75% higher power than for a standard TURP
  - Can combine with TURP
  - Monopolar or bipolar
  - Hope of decrease bleeding while creating a TURP like channel
TUEVP-electrode design

- Rollerball/grooved rollerball
- Wedge
TUEVP-results

- Improvement in symptom score (3/12)
  - from 17.8 to 4.2

- Improvement in Qmax
  - from 7.4 to 17.3 mL/sec

- Comparable to TURP
TUEVP results

- Good short term result
  - Post op catheter duration, hematuria, transfusion rate, and retrograde ejaculation were lower than TURP
  - Operating time, postoperative urinary retention, impotence, and urinary incontinence were higher

- More effective for small prostate
Modifications of TURP

- Use of bipolar electrode and normal saline
Bipolar TURP

- Eliminates the risk of dilutional hyponatremia
- High-risk patients with large prostates that require lengthy resection
- Similar effectiveness
- No distant effects

- Less tissue charring, better identification of the surgical capsule
Bipolar TURP
Endoscopic Bipolar Transurethral Electrovaporization of Prostate (TUEVP) as day procedure

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Division of Urology, Department of Surgery, Queen Elizabeth Hospital, HKSAR
Background

- Transurethral plasma vaporization of the prostate in saline has gained popularity in recent years
- Excellent hemostatic effect and short term outcome

(Reich O, et al., 2009)
Objective

Is it possible to achieve shorter stay in hospital after surgery?
Patients

- Inclusion criteria
  - BPH patient with bothersome LUTS
  - Medically fit
  - Young patients preferred (<65)
  - Strong motivation for early discharge
  - Availability of carer at home
Patients

Exclusion criteria

- BPH with complications e.g. urinary retention
- Small prostate (<15gm)
- Very large prostate (>60gm)
- Multiple medical problems
Method – Pre-op

- Pre op assessment and counselling
  - TRUS size
  - IPSS/QOL;
- Anesthetists assessment (GA/SA)

- Admit early morning of operation
  - Urology ward
  - Day surgery ward
Method – intra op

- First operation in the morning
- TUEVP with “button” electrode (Olympus)
Bipolar vaporization
Method-post-op

- Recovery stage 1:
  - Bladder irrigation for 2 hours
  - Stop irrigation after assessment

- Recovery stage 2:
  - Oral analgesics
  - Urine color observation
  - Remove Foley 4 hours after operation
Method – discharge plan

- Allow discharge home if
  - Clear urine
  - Small post void residual (<350ml)
  - Acceptable pain level

- Options of discharge:
  - Same day (i.e. within 6 hours post op)
  - Early next morning D1 (within 24 hrs post op)
Outcome analysis

- Hemostasis
  - Urine / irrigant color post operatively
  - Need to continue bladder irrigation

- Feasibility of early discharge (within 24 hrs)
  - Voiding function
  - Urine color
  - Pain
  - Patients’ wish

- Unscheduled readmission rate
  - causes
Results

Apr 2010 to July 2010

- 9 patients
- Age: 53-66 (mean 58)
- Prostate size (pre op TRUS)
  - 20-59gm (mean 38gm)
Patient demographics

- **Uroflow:**
  - Qmax – mean: 7.3 ml/s
  - Volume – mean: 267 ml
  - Residual urine – mean 175ml
- **IPSS:**
  - Mean: 22
- **QOL score:**
  - Mean: 4.3
Operation

- Mode of anesthesia
  - 4 General anesthesia
  - 5 Spinal anesthesia
- Operating time
  - 20-50 minutes (mean 38.3 minutes)
- Transfusion
  - 0 patient required transfusion
Results

- **Hemostasis**
  - Bladder irrigation stopped 2 hours post op
  - 0 patient required continuous bladder irrigation
Results-
early discharge

- Early discharge

<table>
<thead>
<tr>
<th>Discharge time</th>
<th>Patient</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 hours</td>
<td>3</td>
<td>No Foley</td>
</tr>
<tr>
<td>24 hours</td>
<td>4</td>
<td>No Foley</td>
</tr>
<tr>
<td>48 hours</td>
<td>1</td>
<td>With Foley</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Successfully voided on 2\textsuperscript{nd} trial</td>
</tr>
</tbody>
</table>
Results

- Unscheduled readmission:
  - 1 patient was readmitted 7 weeks after surgery
    - Acute urinary retention
    - No hematuria
    - Treated empirically as UTI
    - Successful TWOC D2
Conclusion

- Early discharge after TUEVP is feasible in highly selected patients, under close observation.

- Excellent hemostasis is achievable.

- Voiding function in the early post op period is not predictable.
BIPOLAR ENDOSCOPIC ENUCLEATION OF THE PROSTATE FOR THE TREATMENT OF SYMPTOMATIC BENIGN PROSTATE ENLARGEMENT (BPE) LARGER THAN 80 GRAMS: HONG KONG EXPERIENCE


Division of Urology, Department of Surgery, Queen Elizabeth Hospital & Caritas Medical Centre
Introduction

- Surgical management for large benign prostatic enlargement (BPE), such as those 80 to 100g is challenging
- Role of transurethral resection limited by severe hemorrhage, TUR syndrome and the need for reoperation

Seki et al. Curr Opin Urol 2007; 17: 17-21
Introduction

- The standard treatment has been open surgical enucleation
- Concept of enucleation has been adapted into endoscopic procedure using Holmium laser energy (HoLEP)

- Reduced blood loss, catheterisation time and hospital stay with equivalent functional results

Kuntz et al J Endourol 2004; 18: 189-91
Naspro et al Eur Urol 2006; 50: 563-8
Bipolar Enucleation of Prostate

First described by Neill & Gilling in 2006
Neill et al Urology 2006; 68(5):1020-4

Popularised by Prof. CX Liu’s group in China
“经尿道前列腺等离子腔内剜除术”

卞军 等 南方医科大学学报, 2008; 28(5): 742-5
Bipolar Enucleation of Prostate

- Similar surgical approach of enucleation to HoLEP
- Bipolar energy system
- Same instrument as “TURiS”
- Normal saline irrigation
- After enucleation, prostatic tissues are resected using bipolar resectoscope
- No need for morcellation
Initial incision just proximal to veru
Objective

To study the perioperative, early and intermediate term functional outcome of the Bipolar Endoscopic Enucleation technique for symptomatic large BPE in the local population.
Patients and Method

- Prospective data collection
- Caritas medical center and Queen Elizabeth Hospital
- From December 2008 to June 2010
- Inclusion criteria
  - Indicated for surgical treatment for BPE
  - Age above 50
  - Prostate volume by transrectal ultrasound (TRUS) to be 80g or above
  - Understood novel nature of procedure
Patients and Method

Those with elevated PSA
  - TRUS-guided 10-core prostate biopsy

Excluded
  - Histologically proven prostate cancer
  - Previous endoscopic prostate procedures
  - Presence of neuropathic bladder dysfunction
  - Unfit for general anaesthesia
Patients and Method

- Bipolar endoscopic enucleation performed under general anaesthesia
- Bipolar setting:
  - Fr 24 three-way urethral catheter
  - Routine postoperative bladder irrigation
Patients and Method

- Baseline
  - Demographic variables
  - IPSS, QOL, Qmax, post-void residual (PVR) if available
  - Prostate volume, PSA
- Perioperative outcome
- Postoperative
  - IPSS, QOL, Qmax, PVR, prostate volume, PSA
  - At post-op 3rd, 9th and 12th month
Statistics

- Continuous data
  - Expressed as median ± SD unless specified
- Categorical data
  - Expressed as number (percentages)
- Baseline and postoperative variables compared with Wilcoxon signed rank test
- p<0.05 considered significant
- Analysis in intention-to-treat fashion
Results

- 38 patients underwent bipolar endoscopic enucleation from Dec 2008 to Jun 2010
- 24 patients (63.2%) had acute urinary retention
- Mean follow-up 14.5 months

### Demographics

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Data</th>
</tr>
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<tbody>
<tr>
<td>Mean age ± SD</td>
<td>76 ± 7.5</td>
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</table>

<table>
<thead>
<tr>
<th>ASA class</th>
<th></th>
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<tbody>
<tr>
<td>I</td>
<td>3 (7.9%)</td>
</tr>
<tr>
<td>II</td>
<td>27 (71.1%)</td>
</tr>
<tr>
<td>III</td>
<td>8 (21.1%)</td>
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</table>

### Indications

<table>
<thead>
<tr>
<th>Indications</th>
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<tbody>
<tr>
<td>Acute urinary retention</td>
<td>24 (63.2%)</td>
</tr>
<tr>
<td>Poorly controlled LUTS</td>
<td>7 (18.3%)</td>
</tr>
<tr>
<td>BPH with bladder stones</td>
<td>5 (13.2%)</td>
</tr>
<tr>
<td>Refractory hematuria</td>
<td>2 (5.3%)</td>
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</table>
## Baseline variables

<table>
<thead>
<tr>
<th>Baseline variables</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPSS</td>
<td>14± 8.9</td>
</tr>
<tr>
<td>QOL</td>
<td>3 ± 1.4</td>
</tr>
<tr>
<td>Qmax, ml/s</td>
<td>6.9 ± 3.4</td>
</tr>
<tr>
<td>PVR, ml</td>
<td>128 ± 286</td>
</tr>
<tr>
<td>Prostate volume by TRUS, ml</td>
<td>99± 29</td>
</tr>
<tr>
<td>PSA, ng/ml</td>
<td>10.3 ± 15.1</td>
</tr>
</tbody>
</table>
Intra-operative variables

<table>
<thead>
<tr>
<th>Data</th>
<th>Operative time, mins</th>
<th>136 ± 33</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Concomitant cystolithotripsy</td>
<td>5 (13.2%)</td>
</tr>
<tr>
<td></td>
<td>Mean specimen weight, gm</td>
<td>46.5 ± 21.5</td>
</tr>
<tr>
<td></td>
<td>Conversion to open enucleation</td>
<td>2 (5.3%)</td>
</tr>
</tbody>
</table>

- Reason for open conversion
  - Excessively long prostatic passage
### Baseline Data

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>POD 0</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum sodium, mmol/L</td>
<td>139 ± 3</td>
<td>140 ± 3</td>
<td>0.172</td>
</tr>
<tr>
<td>Hemoglobin, g/dL</td>
<td>12.9 ± 1.7</td>
<td>11.7 ± 2.0</td>
<td>0.000</td>
</tr>
</tbody>
</table>

### Postoperative variables

<table>
<thead>
<tr>
<th>Postoperative variables</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Median day of stopping bladder irrigation</td>
<td>1 (1-4)</td>
</tr>
<tr>
<td>Median day of removing catheter</td>
<td>2 (1-13)</td>
</tr>
<tr>
<td>Requirement of re-catheterisation</td>
<td>1 (2.6%)</td>
</tr>
<tr>
<td>Hospital stay after surgery, days</td>
<td>3.0 ± 2.1</td>
</tr>
</tbody>
</table>
| Postoperative complication  
  Urinary tract infection | 4 (10.5%) |
  Clot retention | 0 |
  Blood transfusion | 2 (5.3%) |
<table>
<thead>
<tr>
<th>Post-op 12 months</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worsening of erectile function</td>
<td>2</td>
</tr>
<tr>
<td>Urinary incontinence</td>
<td>0</td>
</tr>
<tr>
<td>Urethral stricture</td>
<td>0</td>
</tr>
<tr>
<td>Recurrent urinary retention</td>
<td>0</td>
</tr>
<tr>
<td>Recurrent hematuria</td>
<td>0</td>
</tr>
<tr>
<td>Bladder stone formation</td>
<td>0</td>
</tr>
<tr>
<td>Re-intervention (drug/ surgery)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Baseline</td>
</tr>
<tr>
<td>--------------</td>
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*P<0.05
IPSS / QOL result
Uroflowmetry result

[Graph 1: Q_max vs. time (pre-op, 3-month, 9-month, 12-month)]

[Graph 2: RU vs. time (pre-op, 3-month, 9-month, 12-month)]
TRUS volume and PSA
Discussion

- Big BPE is problematic and the AUA guideline for prostate >80gm recommends open surgery
- This approach is minimally invasive, effective in removal of prostate tissue and ensures quick recovery
- Only bipolar instruments are required and the procedure is familiar to urologists (like HoLEP + TURP)
This represents the initial experience of the procedure during the early part of the learning curve.

Already showed favorable results in the management of this difficult surgical problem.

The improvement is persistent after 12m and is expected to be durable in view of the effective tissue removal.
Conclusion

- Preliminary experience of bipolar endoscopic enucleation technique for BPE larger than 80g is favorable
  - Fast post-operative recovery
  - Early resumption of self-voiding
  - Effective removal of prostate tissue as shown on post op TRUS and PSA drop
- Improvements shown at 3, 9 and 12-month interval
Conclusion

- Useful minimally invasive method to tackle large BPE requiring surgery
- True role of this technique requires formal comparative study with the gold standard of open retropubic / transvesical prostatectomy
Improve the safety of surgery

- Modification of TURP
- Laser procedures
- Less invasive alternatives
Laser Procedures

- Neodymium:yttrium-aluminum-garnet (Nd:YAG) laser
- Potassium titanyl phosphate (KTP) laser
- Holmium:yttrium-aluminum-garnet (Ho:YAG) laser
- Diode Laser
- End firing
- Side firing
- Intestinal
Laser procedures

- VLAP (Costello 1992)
- Interstitial laser (Muschter 1994)
Laser procedures

- Holmium laser enucleation of the prostate (HoLEP)
Laser procedures

- Photoselective vaporization of the prostate (PVP)
- Greenlight PV Laser System
- High-power 120W KTP laser
Laser procedures

- Considerations
  - Cost
  - Effectiveness
  - Potential benefit to patients
  - Long term results
Improve the safety of surgery

- Modification of TURP
- Laser procedures
- Less invasive alternatives
Less invasive alternatives

Stents

- UroLume
Less invasive alternatives

Stents
- Memokath
Less invasive procedures

- Transurethral needle ablation of the prostate (TUNA)
Less invasive procedures

- Transurethral microwave therapy (TUMT)
Less invasive procedures

- LA procedures

Considerations
- Effectiveness
- Complications
- Cost
Take home messages

- TURP is still the gold standard
- Modification of TURP, laser Rx and less invasive procedures provide alternatives with potential less morbidity
- Treatment must be individualized
- Cost effectiveness is an important consideration