PROSTATE EMBOLIZATION (PAE)

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Disclosure

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I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

I do not have any potential conflict of interest
CONVENTIONAL BPH TREATMENTS

- Medical therapy – 1st line option
- Minimally invasive surgical therapy (MIST)
- Prostatectomy:
  - Transurethral resection (TURP) < 60-80 cc
  - Open surgery > 60-80 cc

All may be Associated to:
  - High morbidity
  - Sexual dysfunction
1st CASE (MARCH 2009)

- 76 years old
- 2 - TURP
- AUR – bladder catheter for 3 months
- 5 days after PAE, catheter removed, pt could urinate
- 6 months later, his girlfriend 39 years old, pregnant
PARAMETERS FOR EVALUATION

- IPSS (international prostate symptoms score): 0 – 35;
- QoL – (quality of life): 0 – 6;
- IIEF (international index of erectile function): 1 – 25
### International Prostate Symptom Score

<table>
<thead>
<tr>
<th>1. INCOMPLETE EMPTYING</th>
<th>Not at All</th>
<th>Less Than 1 Time in 5</th>
<th>Less Than Half the Time</th>
<th>About Half the Time</th>
<th>More Than Half the Time</th>
<th>Almost Always</th>
<th>Your Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over the past month, how often have you had a sensation of not emptying your bladder completely after you finished urinating?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. FREQUENCY</th>
<th>Not at All</th>
<th>Less Than 1 Time in 5</th>
<th>Less Than Half the Time</th>
<th>About Half the Time</th>
<th>More Than Half the Time</th>
<th>Almost Always</th>
<th>Your Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over the past month, how often have you had to urinate again less than 2 hours after you finished urinating?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. INTERMITTENCY</th>
<th>Not at All</th>
<th>Less Than 1 Time in 5</th>
<th>Less Than Half the Time</th>
<th>About Half the Time</th>
<th>More Than Half the Time</th>
<th>Almost Always</th>
<th>Your Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over the past month, how often have you found you stopped and started several times when you urinated?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. URGENCY</th>
<th>Not at All</th>
<th>Less Than 1 Time in 5</th>
<th>Less Than Half the Time</th>
<th>About Half the Time</th>
<th>More Than Half the Time</th>
<th>Almost Always</th>
<th>Your Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over the past month, how often have you found it difficult to postpone urination?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. WEAK STREAM</th>
<th>Not at All</th>
<th>Less Than 1 Time in 5</th>
<th>Less Than Half the Time</th>
<th>About Half the Time</th>
<th>More Than Half the Time</th>
<th>Almost Always</th>
<th>Your Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over the past month, how often have you had a weak urinary stream?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. STRAINING</th>
<th>Not at All</th>
<th>Less Than 1 Time in 5</th>
<th>Less Than Half the Time</th>
<th>About Half the Time</th>
<th>More Than Half the Time</th>
<th>Almost Always</th>
<th>Your Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over the past month, how often have you had to push or strain to begin urination?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7. NOCTURIA</th>
<th>Not at All</th>
<th>Less Than 1 Time in 5</th>
<th>Less Than Half the Time</th>
<th>About Half the Time</th>
<th>More Than Half the Time</th>
<th>Almost Always</th>
<th>Your Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over the past month, how many times did you most typically get up to urinate from the time you went to bed at night until the time you got up in the morning?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Which of the above do you regard as most troublesome? (1 – 7)

**TOTAL PROSTATE SYMPTOM SCORE**

<table>
<thead>
<tr>
<th>Delighted</th>
<th>Pleased</th>
<th>Mostly Satisfied</th>
<th>Mixed – Satisfied and Dissatisfied</th>
<th>Mostly Dissatisfied</th>
<th>Unhappy</th>
<th>Terrible</th>
</tr>
</thead>
</table>

### QUALITY OF LIFE DUE TO URINARY SYMPTOMS
If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that? (pick one)

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<th>Pleased</th>
<th>Mostly Satisfied</th>
<th>Mixed – Satisfied and Dissatisfied</th>
<th>Mostly Dissatisfied</th>
<th>Unhappy</th>
<th>Terrible</th>
</tr>
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<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
Table 2  The IIEF-5 questionnaire

<table>
<thead>
<tr>
<th>Over the past six months:</th>
<th>Very low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Very high</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 How do you rate your confidence that you could get and keep an erection?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2 When you had erections with sexual stimulation, how often were your erections hard enough for penetration?</td>
<td>Almost never/never</td>
<td>A few times (much less than half the time)</td>
<td>Sometimes (about half the time)</td>
<td>Most times (much more than half the time)</td>
<td>Almost always/always</td>
</tr>
<tr>
<td>3 During sexual intercourse, how often were you able to maintain your erection after you had penetrated (entered) your partner?</td>
<td>Almost never/never</td>
<td>A few times (much less than half the time)</td>
<td>Sometimes (about half the time)</td>
<td>Most time (much more than half the time)</td>
<td>Almost always/always</td>
</tr>
<tr>
<td>4 During sexual intercourse, how difficult was it to maintain your erection to completion of intercourse?</td>
<td>Extremely difficult</td>
<td>Very difficult</td>
<td>Difficult</td>
<td>Slightly difficult</td>
<td>Not difficult</td>
</tr>
<tr>
<td>5 When you attempted sexual intercourse, how often was it satisfactory for you?</td>
<td>Almost never/never</td>
<td>A few times (much less than half the time)</td>
<td>Sometimes (about half the time)</td>
<td>Most times (much more than half the time)</td>
<td>Almost always/always</td>
</tr>
</tbody>
</table>

*The IIEF-5 score is the sum of the ordinal responses to the five items; thus, the score can range from 5 to 25.*
BPH PATIENT WORK UP

- IPSS, 0 – 35; QoL – 0 – 6; IIEF 1-25
- Clinical History – smoking, diabetes, vascular d.
- Physical examination - DRE
- Prostate volume – TRUS, MR
- PSA – (Prostate specific antigen)
- Uroflowmetry
  - Qmax (Peak urinary flow) <12 mL/s
  - PVR (post-void residual volume) < 50cc
- Urodynamic Study
INCLUSION CRITERIA

- Age superior to 40 years
- Failure of medical treatment (6 months) or refuse medical treatment
- Both the following criteria:
  - IPSS ≥ 18 and/or QoL ≥ 3
  - Qmax (peak urinary flow rate) < 12mL/seg or acute urinary retention
- Prostate volume > 35cc
- Sexual dysfunction or accepting its risk after PAE
EXCLUSION CRITERIA

- Malignancy
- Advanced atherosclerosis (iliac, prostatic arteries)
  - Angio CT
- Detrusor failure
- Large bladder diverticulum or stone
- Neurogenic bladder
- Stenosis of the urethra

28-01-2016
PATIENTS SELECTION
PRE-PROCEDURE CT ANGIOGRAPHY

- Iliac and prostate arteries atherosclerotic changes
- Origin and direction of prostatic arteries
- Nº of pedicles
- Anastomoses
CT - ANGIOGRAPHY

Information to give to patients

Impossible

Very difficult

Difficult

Fair

Easy
Figure 1. Schematic drawing of the different PA origins.
Major Goal of PAE

- LUTS – reduction
- PV no decrease 20%
DSA – IIA

*DSA Ipsilateral oblique - 35°, caudal – cranial 10°*

*8 mL – 3 mL/s*
Major Complications

- Bladder wall ischemia
- Perineal pain (3 months)
  - No:
    - Sexual dysfunction
    - Urinary incontinence

28-01-2016
Common minor Complications

• Hematuria
• Hematospermia
• Rectorragia
• Burning sensation
• Slight pelvic pain
Whole-mount of the specimen

Necrotic tissue with shadows of prostatic acini (arrows)

Necrotic prostatic acini:
- Epithelium with desquamation (arrows)
- Corpora amylacea in the lumen (large arrows)

HE – 40x

HE – 100x

HE 400x
PAE WORKSHOPS

• WEDNESDAY
  • How to do PAE
  • PA Anatomy

• THURSDAY
  • Angio-Suite
  • 4-8 cases of PAE

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Conclusion

- Very Promising
- Alternative treatment:
  - Medication
  - Surgery
  - Risks
  - Refuse
- Low morbidity
- In 4-5 years PAE will be the standard treatment for BPH, if prostate arteries are available for PAE

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28-01-2016