Tipps and Tricks: open retropubic radical prostatectomy and extended pelvic lymphadenectomy

Axel Heidenreich, Department of Urology
Content of Presentation

- extended pelvic lymphadenectomy
- nerve sparing prostatectomy
- non-nerve sparing prostatectomy
- radical salvage prostatectomy
Content of Presentation

- extended pelvic lymphadenectomy (EPLND)
- nerve sparing prostatectomy
- non-nerve sparing prostatectomy
- radical salvage prostatectomy
EPLND – who?

- low risk if > 50% biopsy cores are involved with cancer\(^1\)
- intermediate risk PCA\(^2\)
- high risk PCA
- all candidates for radical salvage prostatectomy\(^3\)

\(^1\)Heidenreich A et al., BJU Int 2011; \(^2\)Heidenreich A et al., Eur Urol 2008; \(^3\)Heidenreich A et al., Eur Urol 2010
EPLND – surgical approach?

6 cm

1 Heidenreich A et al., BJU Int 2011; 2 Heidenreich A et al., Eur Urol 2008; 3 Heidenreich A et al., Eur Urol 2010
inferior vesical artery
superior vesical artery
superior gluteal artery
internal iliac artery and vein
aorta
vena cava
ureter
genitofemoral nerve
eoburator nerve
obturator vessels
pudendal vessels
common iliac artery and vein
common iliac artery and vein
superior gluteal artery
superior vesical artery
inferior vesical artery
external iliac artery and vein
common iliac artery and vein
internal iliac artery and vein
obturator nerve
obturator vessels
pudendal vessels
Heidenreich A et al., BJU Int 2011
Heidenreich A et al., Eur Urol 2008
Heidenreich A et al., Eur Urol 2010
Heidenreich A et al., J Urol 2011
EPLND – how?

1 Heidenreich A et al., BJU Int 2011; 2 Heidenreich A et al., Eur Urol 2008; 3 Heidenreich A et al., Eur Urol 2010
EPLND – how?

1Heidenreich A et al., BJU Int 2011; 2Heidenreich A et al., Eur Urol 2008; 3Heidenreich A et al., Eur Urol 2010
EPLND – precautions

- send all anatomical regions in separate packages => lymph node yield↑↑↑
- do not include the lymph nodes lateral to the external iliac artery => risk of lymphedema↑
- use small clips or ligatures for lymph vessels, no coagulation => risk of lymphoceles↓
- leave 1-2 drains until ≤ 50 ml/day and site

\[\text{\textsuperscript{1}}\text{Heidenreich A et al., BJU Int 2011; } \text{\textsuperscript{2}}\text{Heidenreich A et al., Eur Urol 2008; } \text{\textsuperscript{3}}\text{Heidenreich A et al., Eur Urol 2010}\]
EPLND – complications

Pelvic lymphocele in 3-5%

1Heidenreich A et al., BJU Int 2011; 2Heidenreich A et al., Eur Urol 2008; 3Heidenreich A et al., Eur Urol 2010
EPLND – complications

How to manage lymphoceles?

• if asymptomatic, no compression of ureter or external iliac vein
  => watch and wait

• if symptomatic & small  => percutaneous drainage

• if symptomatic & large  => laparoscopic marsupialisation

• if symptomatic & fever  => percutaneous drainage, culture, antibiotics

1Heidenreich A et al., BJU Int 2011; 2Heidenreich A et al., Eur Urol 2008; 3Heidenreich A et al., Eur Urol 2010
Content of Presentation

• extended pelvic lymphadenectomy
• *nerve sparing prostatectomy*
• non-nerve sparing prostatectomy
• radical salvage prostatectomy
What do we need?
What do we need?

Magnification 3.5x at 50cm
Anatomical preparation

• patient in Trendelenburg position
• combination of general and peridural anesthesia
• ≤ 500 – 1000ml iv fluids until prostate is removed

=> minimal blood loss of 340cc, low transfusion rate < 0.5%
Anatomical preparation

- clearance of the ventral prosata and endopelvic fascia from fat, dissection of dorsal penile vein (clips)
- incision of endopelvic fascia
- blunt dissection of all muscle fibers of levator ani and levator urethrae
- incision of puboprostatic ligaments
Anatomical preparation

- stay sutures at 2 and 10 o’clock
- identification of plane between Santorini Plexus and urethra
- upper membrane = endopelvic fascia
- lower membrane = striated external sphincter
- 2-0 suture on a CTX needle to tie plexus
Nerve Sparing Procedure

- high incision of the periprostatic fascia

<table>
<thead>
<tr>
<th>Sector</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>med. Σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apex</td>
<td>8,1%</td>
<td>5,4%</td>
<td>8,1%</td>
<td>24,3%</td>
<td>21,6%</td>
<td>5,4%</td>
<td>37</td>
</tr>
<tr>
<td>Mid part</td>
<td>6,6%</td>
<td>4,9%</td>
<td>9,8%</td>
<td>36,1%</td>
<td>25,4%</td>
<td>3,3%</td>
<td>61</td>
</tr>
<tr>
<td>Base</td>
<td>5,2%</td>
<td>9,5%</td>
<td>13,8%</td>
<td>39,7%</td>
<td>25,9%</td>
<td>5,2%</td>
<td>58</td>
</tr>
</tbody>
</table>

21-29% 46-66%
Nerve sparing procedure

- small incision of the parapelvic fascia
- identification of an areolar space containing fat, connective tissue, veins
- undermining with a small overholt clamp
- Identification right plane, fascia and vessels are clipped
- NVB pushed away gently
Nerve sparing procedure
Nerve sparing procedure

- NVB separated from the lateral urethra and the Mueller’s ligament
- NVB is pushed laterally gently
- NVB lies lateral to the prostate and the urethra
Nerve sparing procedure

- Identification of the apex, urethra distal to apex
- Incision of the urethra
- Identification of mucosa, striated external sphincter (circular), longitudinal smooth muscle (longitudinal)
Nerve sparing procedure

- Placement of anastomotic sutures (3-0 monocryl, 5/8 curved needle)
- Do not include the NVB!!
Early Continence Recovery after Open Radical Prostatectomy with Restoration of the Posterior Aspect of the Rhabdosphincter

Francesco Rocco a,*, Luca Carmignani a, Pietro Acquati a, Franco Gadda a, Paolo Dell’Orto a, Bernardo Rocco b, Stefano Casellato a, Giacomo Gazzano c, Dario Consonni d

Table 2 – Continence rates after catheter removal

<table>
<thead>
<tr>
<th></th>
<th>3 d</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Group A (N = 31)</td>
</tr>
<tr>
<td></td>
<td>n (%)</td>
</tr>
<tr>
<td>Continenence</td>
<td>8 (25.8)</td>
</tr>
<tr>
<td>Incontinence</td>
<td>23 (74.2)</td>
</tr>
<tr>
<td>Moderate</td>
<td>8</td>
</tr>
<tr>
<td>Severe</td>
<td>15</td>
</tr>
<tr>
<td>Pearson $\chi^2$</td>
<td></td>
</tr>
<tr>
<td>p</td>
<td></td>
</tr>
</tbody>
</table>

* Yates’s continuity correction.
Apical preparation – individual configuration
Apical preparation

Up to 40% of functional urethral length is covered by the apex
Right Side: Intrafascial Nerve Sparing
Content of Presentation

• extended pelvic lymphadenectomy

• nerve sparing prostatectomy

• non-nerve sparing prostatectomy

• radical salvage prostatectomy
Locally Advanced PCA
Risk Adapted Radical Prostatectomy

Extended radical prostatectomy

Apical preparation
dorsolateral präparation
### Risk Adapted Radical Prostatectomy

**Extended radical prostatectomy**

<table>
<thead>
<tr>
<th></th>
<th><strong>Extended RP</strong></th>
<th><strong>classical RP</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>n = 102</td>
<td>n = 186</td>
</tr>
<tr>
<td>pR1</td>
<td>12.4%</td>
<td>62.3%</td>
</tr>
<tr>
<td>catheter ex, day 5</td>
<td>96%</td>
<td>97%</td>
</tr>
<tr>
<td>continence, Tag 7</td>
<td>48%</td>
<td>52%</td>
</tr>
<tr>
<td>continence, month 3</td>
<td>89%</td>
<td>88%</td>
</tr>
</tbody>
</table>
## Extended Radical Prostatectomy

<table>
<thead>
<tr>
<th>Author</th>
<th>n</th>
<th>SM+ (extended)</th>
<th>SM+ (Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stephenson, ‘97</td>
<td>144</td>
<td>11%</td>
<td>--</td>
</tr>
<tr>
<td>Alsikafi, ’98</td>
<td>53</td>
<td>7.5%</td>
<td>--</td>
</tr>
<tr>
<td>van Poppel, 06</td>
<td>145</td>
<td>9.3%</td>
<td>36%</td>
</tr>
<tr>
<td>Heidenreich, 06</td>
<td>112</td>
<td>8.5%</td>
<td>32%</td>
</tr>
</tbody>
</table>
Locally Advanced PCA

Positive surgical margins predict success of surgery

Cancer Specific Survival

Cure is possible

- Complete resection of cancer
- Negative surgical margins
- Complete eradication of micrometastases

→ Adaptation of surgical technique
Content of Presentation

• extended pelvic lymphadenectomy
• nerve sparing prostatectomy
• non-nerve sparing prostatectomy

• *radical salvage prostatectomy*
Patients (data registry: n = 167)

- N = 98
- Age 65 (45 – 82) years
- PSA 7.8 (1.2 – 24) ng/ml


- EBRT 30
- HDR – Brachytherapy 19
- LDR – Brachytherapy 49

Heidenreich A et al., Eur Urol 2010
## Radical Salvage Prostatectomy

<table>
<thead>
<tr>
<th></th>
<th>LDR</th>
<th>EBRT</th>
<th>HDR</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OR-time (min)</strong></td>
<td>115 (95-130)</td>
<td>128 (112-137)</td>
<td>145 (105-165)</td>
<td>120 (95-165)</td>
</tr>
<tr>
<td><strong>Blood loss (ml)</strong></td>
<td>300 (150-450)</td>
<td>375 (150-550)</td>
<td>420 (200-1450)</td>
<td>360 (150-1450)</td>
</tr>
<tr>
<td><strong>Rectal injury</strong></td>
<td>0/49</td>
<td>1/30</td>
<td>1/19</td>
<td>2/98 (2.1%)</td>
</tr>
<tr>
<td><strong>Perioperative</strong></td>
<td>2/49</td>
<td>1/30</td>
<td>2/19</td>
<td>5/98 (5.1%)</td>
</tr>
<tr>
<td><strong>complications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>catheterization</strong></td>
<td>7.5 (7-10)</td>
<td>8 (7-15)</td>
<td>8.5 (7-28)</td>
<td>8 (7-28)</td>
</tr>
<tr>
<td><strong>(days)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hospitalisation</strong></td>
<td>8.5 (8-11)</td>
<td>9.5 (8-12)</td>
<td>10 (8-14)</td>
<td>9.2 (8-14)</td>
</tr>
<tr>
<td><strong>(days)</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Heidenreich A et al., Eur Urol 2010
## Pitfalls of RSP

<table>
<thead>
<tr>
<th></th>
<th>EBRT</th>
<th>LDR-Brachy</th>
<th>HDR-Brachy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatium Retzii</td>
<td>fibrosis</td>
<td>opB</td>
<td>(opB)</td>
</tr>
<tr>
<td>EPLND</td>
<td>fibrosis</td>
<td>opB</td>
<td>(opB)</td>
</tr>
<tr>
<td>Apex</td>
<td>(opB)</td>
<td>dense fibrosis</td>
<td>fibrosis</td>
</tr>
<tr>
<td>Rectum</td>
<td>opB</td>
<td>dense fibrosis</td>
<td>dense fibrosis</td>
</tr>
<tr>
<td>Bladder neck</td>
<td>opB</td>
<td>opB</td>
<td>opB</td>
</tr>
</tbody>
</table>

Heidenreich A et al., Eur Urol 2010
Complications & Outcome

- complications and outcome depend on patient selection, type of RT and surgical experience

<table>
<thead>
<tr>
<th></th>
<th>EBRT</th>
<th>Temporary BT</th>
<th>Permanent BT</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>30</td>
<td>19</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>pT2a-c</td>
<td>20 (66.7%)</td>
<td>9 (48%)</td>
<td>40 (81.6%)</td>
<td>0.02*</td>
</tr>
<tr>
<td>pT3a-b</td>
<td>10 (33.3%)</td>
<td>10 (52%)</td>
<td>9 (18.4%)</td>
<td>0.001*</td>
</tr>
<tr>
<td>pN1</td>
<td>5 (16.6%)</td>
<td>6 (31%)</td>
<td>3 (6.1%)</td>
<td>0.001*</td>
</tr>
<tr>
<td>SM+</td>
<td>4 (13.3%)</td>
<td>4 (21.1%)</td>
<td>3 (6.1%)</td>
<td>0.001*</td>
</tr>
</tbody>
</table>

*p for comparison permanent BT versus EBRT/temporary BT
Complications & Outcome

- complications and outcome depend on patient selection, type of RT and surgical experience

<table>
<thead>
<tr>
<th></th>
<th>Institution A</th>
<th>Institution B</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>98</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td># surgeons</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>OR-time (min)</td>
<td>121 (90-165), EPLND in 75</td>
<td>150 (100-214), EPLND in 5</td>
<td>0.03</td>
</tr>
<tr>
<td>blood loss (ml)</td>
<td>360 (150-1450)</td>
<td>525 (250-2000)</td>
<td></td>
</tr>
<tr>
<td>rectal lesion</td>
<td>2 (2.1%)</td>
<td>3 (14.3%)</td>
<td>0.04</td>
</tr>
<tr>
<td>SM+</td>
<td>11 (11.2%)</td>
<td>10/21 (47.6%)</td>
<td>0.001</td>
</tr>
<tr>
<td>continence</td>
<td>81.3%</td>
<td>80.9%</td>
<td>ns</td>
</tr>
</tbody>
</table>