Robotic Assisted Radical Cystectomy

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No Financial relationship

Disclosure code : N
Radical Cystectomy remains the standard of care for MIBC and some NMIBC, however, it remains a procedure associated with HIGH MORBIDITY.

- 2010 – 2015: 6,510 patients.
  - 31.5% had complications.
  - 40.7% required blood transfusions.
  - LOS decreased:
    - 2010: 10.6 days
    - 2015: 9.2 days (P<0.01)
  - Readmissions increased to 21.4% in 2015 (p<0.01)

Johnson SC et al. Urologic Oncology 2017
Robotic Radical Cystectomy

- Has increased in the USA since its first description in 2003.¹
  - 28.9% - 39.4% of RC are performed robotically in contemporary studies.²,³
- In some institutions, 100% of RC are now performed robotically.⁴

Robotic Radical Cystectomy

✓ RARC, has demonstrated **similar oncological outcomes** compared to open surgery with respect to:

- Surgical Margins $^{1,2}$
- Number of lymph nodes resected $^{1-5}$
- 5 year cancer specific and overall survival $^5$
- Local and distant recurrences $^{6-8}$

Robotic Radical Cystectomy

Patients that undergo RARC have a longer OR time, however:

- Less estimated blood loss \(^1\)-\(^4\)
- Less risk of blood transfusion \(^1\)-\(^4\)
- Less hospital length of stay (LOS) \(^2\)-\(^4\)

2. Parekh DJ, AUA 2017 Late Breaking Abstract
In a review of 273 articles:

- 4 RCT were included = 239 patients

No difference:

- 30 day complications
- 90 day complications
- Overall grade 3-5 complications at 30 or 90 days
- Health related quality of life at 3 and 6 months

Complications and health-related quality of life after robot-assisted versus open radical cystectomy: a systematic review and meta-analysis of four RCTs

Table 1 Individual study characteristics

Lauridsen SV, et al. Systematic Reviews 2017
Intracorporeal Urinary Diversion

- Has demonstrated in retrospective series:
  - Less complications:
    - Gastrointestinal (23% to 10%; p <0.001)
    - Infection related (18% to 10%; p=0.035)
  - Less readmissions at:
    - 30 days (15% to 5%; p<0.001)
    - 90 days (19% to 12%; p=0.016)

Dason S et al. Curr Opin Urol 2018
Radical Cystectomy

Evolution of a Technique

Open

Laparoscopic

Robotic
Robotic Radical Cystectomy

Reconstructive Part:
Intracorporeal Ileal Conduit
Ureteral Intestinal Anastomosis

Evolution
Urinary Diversion

Robotic Extra-corporeal

Robotic Intra-corporeal
Robotic Radical Cystectomy

Reconstructive Part:
Intracorporeal Orthotopic Neobladder

Evolution
Neobladder

Robotic Extra-corporeal

Robotic Intra-corporeal
“W” Intracorporeal Neobladder with one left side isoperistaltic limb"
### Characteristics of Intracorporeal Neobladder Series

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of ileum used (cm)</td>
<td>60</td>
<td>50</td>
<td>45–50</td>
<td>50</td>
<td>42</td>
<td>Not stated</td>
<td>50</td>
</tr>
<tr>
<td>Method of ileal detubularization</td>
<td>Scissors</td>
<td>Scissors</td>
<td>Scissors</td>
<td>Scissors</td>
<td>Stapler</td>
<td>Stapler</td>
<td>Scissors</td>
</tr>
<tr>
<td>Pouch construction</td>
<td>Sewn</td>
<td>Sewn</td>
<td>Sewn</td>
<td>Sewn</td>
<td>Stapler</td>
<td>Stapler</td>
<td>Sewn</td>
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<tr>
<td>Rotation of the pouch</td>
<td>90°</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Equal cross-folding</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Urethroileal anastomosis</td>
<td>After posterior plate completion</td>
<td>Start of reconstruction</td>
<td>After posterior plate completion</td>
<td>Start of reconstruction</td>
<td>After pouch completion</td>
<td>After pouch completion</td>
<td>Start of reconstruction</td>
</tr>
<tr>
<td>Ureteroileal anastomosis</td>
<td>Bricker</td>
<td>Wallace</td>
<td>Bricker</td>
<td>Bricker</td>
<td>Modified split-nipple</td>
<td>Bricker</td>
<td>Wallace</td>
</tr>
<tr>
<td>Stenting</td>
<td>Percutaneous, internalized</td>
<td>Percutaneous, internalized</td>
<td>Percutaneous, externalized</td>
<td>Percutaneous</td>
<td>Percutaneous</td>
<td>Per urethra, internalized</td>
<td>Percutaneous, internalized</td>
</tr>
<tr>
<td>Afferent limb</td>
<td>Yes</td>
<td>Yes</td>
<td>Double</td>
<td>Double</td>
<td>None</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Shape</td>
<td>Globular</td>
<td>Amorphous</td>
<td>W</td>
<td>Pyramid</td>
<td>Triangular with neobladder neck</td>
<td>U-shaped tube</td>
<td>Amorphous</td>
</tr>
</tbody>
</table>

Dason S et al. Curr Opin Urol 2018
Robotic Radical Cystectomy + Intracorporeal Urinary Diversion

- Facts...
  - It can be done safely
  - More institutions are performing it
  - The surgical technique should be diffused
Robotic Radical Cystectomy: Surgical Hints
Patient & Trocar Positioning

- Patient in supine modified low lithotomy position
- Arms are tucked to the body
- OG Tube during procedure
- Foley to drain bladder
Patient is then placed in steep Trendelemburg position.

Hand held Robotic Camera visualizes full retraction of bowel toward the upper abdomen.

Reverse Trendelemburg is applied until bowel holds in the upper abdomen.
Robotic Radical Cystectomy
Robot Docking
Robotic Radical Cystectomy: Surgical Hints Peri-Ureteral and Lateral Pelvic Space

- Always preserve the adventitia of the ureter.
- Clip the ureters:
  - To prevent urine spillage to have an exact EBL and prevent seeding of malignant cells.
  - To create ureteral dilatation to facilitate ureteral intestinal anastomosis
Robotic Radical Cystectomy: Surgical Hints
Anterior Rectal Space
Pedicle control with Articulating Endo GIA:
- 60 mm x 2.2 mm
- 45 mm x 2.2 mm

Fulguration and resection of anterior bladder attachments (Urachus)

Dorsal vein complex ligation with a 0 vicryl in a CT 1 needle cut to 6 inches.
Robotic Radical Cystectomy: Surgical Hints

Left NVB Preservation

Right NVB Preservation
Robotic Radical Cystectomy: Surgical Hints
Urethral Control

Clipping the Urethra

Clipping the Foley
Robotic Radical Cystectomy: PLND

| Lymph node chain | Boundaries of lymph node dissection  
|------------------|-----------------------------------
|                  | Proximal - Distal - Medial - Lateral  
| External iliac (1) | Bifurcation of common iliac artery - pelvic floor  
|                   | - midline of external iliac artery - genitofemoral nerve  
| Obturator (2)     | Bifurcation of common iliac artery - pelvic floor  
|                   | - obturator nerve - midline of external iliac artery  
| Deep Obturator / Hypogastric (3) | Origin of obturator nerve - pelvic floor - bladder wall  
|                  | - pelvic side wall including triangle (fossa) of Marcille  
| Common iliac (4)  | Aortic bifurcation - Origin of internal and external iliac artery  
|                  | - midline of common iliac artery - genitofemoral nerve  
| Presacral (5)     | Triangle between midline of the common iliac arteries  
|                  | - bifurcation of internal and external arteries, dorsal border is sacrum and medial skeletonization of internal iliac vessels  

External iliac nodes
Robotic Radical Cystectomy: Surgical Hints
Ureteral Transposition
Robotic Radical Cystectomy: Surgical Hints
Bowel and Mesenteric Vascular Identification

- Prevent injury of major mesenteric arcades with:
  - Indocyanine Green (2 ml ICG)
  - White Light Transillumination

- Specially if you need to resect the mesentery further in.
Robotic Radical Cystectomy: Surgical Hints
Intracorporeal Ileal Conduit: Ileal Side-Side Reanastomosis

Bowel Clamp (Graptor) Technique

Marionette Technique
Robotic Radical Cystectomy: Surgical Hints
Intracorporeal Ileal Conduit Creation

Ureteral – Intestinal Anastomosis

Ureteral Stents Passage
Intracorporeal Neobladder Creation
Tips and Tricks – Tension Free Urethral Anastomosis

- Posterior Denonvilliers’ Reconstruction
  - Brings urethral stump 2-3 cm into the pelvis
- Sigmoid colon retraction
- Mesenteric incision extension
  - Brings ileum segment closer to the pelvis 3-5 cm
- Neobladder Neck Flap
  - Brings neobladder 2-3 cm closer to urethral stump
- Reverse Trendelemburg even further
Posterior Denonvilliers’ Reconstruction
Sigmoid Colon Retraction
Intracorporeal Neobladder
“W” configuration and stabilization

“W” = Each ileal segment - 15 cm
(15 x 4 = 60 cm)
Left sided isoperistaltic segment of 10 cm

Total: 70 cm of ileum
Intracorporeal “W” Neobladder Creation
RARC + Intracorporeal Neobladder
Final Result
Robotic Radical Cystectomy Experience

- 2010-2016: FU 25 months (3-60)
- 69 Patients (13 females)
  - 40 ileal conduit (23 intracorporeal)
  - 27 Orthotopic Neobladder (22 intracorporeal)
  - 2 Cutaneous Ureterostomies (2 intracorporeal)
- OR: 320 min. (240 – 480)
- EBL: 325 cc (150 – 500)
- Hospital Stay: 5 (3-9)

### Oncological Outcomes

<table>
<thead>
<tr>
<th>Stage</th>
<th>M+ (%)</th>
</tr>
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<tbody>
<tr>
<td>pT0</td>
<td>3</td>
</tr>
<tr>
<td>pT2</td>
<td>48</td>
</tr>
<tr>
<td>pT3</td>
<td>11</td>
</tr>
<tr>
<td>pT4</td>
<td>7</td>
</tr>
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<td></td>
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</table>
Of the Intracorporeal Neobladders...

Results (means)

- FU: 18 months
- BMI: 31
- Surgical Time: 340 min
- EBL: 250 cc
- JP drain: 5 days
- Hospital stay: 5 days
- JP drainage: 5 days
- Ureteral stents: 10 days
- Foley catheter: 21 days
- Day time continence: 100%
- Night time continence: 85%
- 21% had Clavien type 1 and 2 complications.
RARC with Intracorporeal Neobladder

FUTURE

- It will continue to increase world-wide
- The newer generation of robotic surgeons will be comfortable performing intracorporeal urinary diversions
- More institutions will only use the robotic assisted approach for performing radical cystectomies and urinary diversions.
Conclusions

✧ Strict knowledge of pelvic anatomy, and adherence to oncological principles, enhances oncological results.

✧ Intracorporeal reconstruction of the urinary tract, following strict proven urinary diversion principles:
  ✓ May improve the morbidity of this complex procedure even further, and
  ✓ Give functional results comparable to open urinary diversion reconstruction techniques.