Surgical Management of Bladder Cancer

Lewis E. Harpster MD, FACS

October 20, 2015
Objectives

• Review bladder cancer epidemiology, pathology.

• Appreciate differences between superficial and muscle invasive disease.

• Understand the role of surgery in bladder cancer management.

• Describe major types of urinary diversion.
Epidemiology

- 74,000 new cases; 16,000 deaths (2015)
- 2nd most common urologic malignancy
- 7% of cancers in men
- < 3% of cancers in women
- M:F = 4:1
- 90% age > 55
- White > Black > Hispanic
Risk Factors

- **Smoking** increases risk 4x
- **Arylamines** painters, rubber and textile workers
- **Chronic irritation** infection, catheter, Shistosomiasis
- **Radiation therapy** prostate, uterine, cervical
- **Chemotherapy** cyclophosphamide, ifosfamide
- **Drugs** pioglitazone (Actos)
- **Familial or genetic** Lynch Syndrome
Presentation

- Gross Hematuria, Painless (70%)
- Microhematuria
- Voiding Symptoms
- Urinary Retention
- Flank Pain
- Weight Loss, Anorexia, Fatigue
- LE Edema
- Bone pain
Diagnosis

- Cystoscopy
- Urine Cytology
- CT Urography
Diagnosis

- Cystoscopy
- Urine Cytology
- CT Urography
- Chest CT
- Bone Scan
- PET Scan
Diagnosis

Transurethral Resection of Bladder Tumor (*TURBT*)

- diagnostic and therapeutic
- provides tissue for:
  - *Tumor Grade (aggressiveness)*
  - *Tumor Stage (depth of invasion)*
- allows retrograde urography when indicated
- bimanual exam (*EUA*)
Pathology

Histologic Types of Bladder Cancer

- Urothelial: 92%
- Squamous: 5%
- Adenocarcinoma: 2%
- Small Cell: 1%
- All others: <1%
Tumor Grade

Papilloma (*PUNLMP*)

Low Grade

High Grade

High grade tumors more likely to recur, progress
Tumor Stage

Epithelium
Lamina propria
Muscle
Adipose
Tumor Stage

Tis

- carcinoma in situ
- epithelial confined
- flat, planar
- velvety, red patch
- usually high grade
- 50% progress to invasive tumor
Tumor Stage

**Ta**
- papillary, raised
- confined to epithelium
- often recur
- rarely progress
Tumor Stage

T1

- may be papillary or sessile
- confined to lamina propria
- when low grade, behaves like Ta
- when high grade, behaves like T2
Tumor Stage

T2
- T2a superficial muscle
- T2b deep muscle
- nodal metastasis in 50% at diagnosis
- typically warrant cystectomy
Tumor Stage

T3

- T3a invades into perivesical fat
- T3b invades beyond perivesical fat
- increased incidence of nodal and distant metastasis
Tumor Stage

T4

- Involves contiguous organs by direct extension
- prostate, rectum, small bowel
- may require pelvic exenteration
Superficial Bladder Cancer

- Tis, Ta, T1
- 80-85% of initial tumors
- 70-75% recurrence rate
- Most remain superficial
- May progress to muscle invasive disease

_Tumor stage, more than grade, determines management_
Invasive Bladder Cancer

- T2, T3, T4
- 15-20% of initial tumors
- most muscle invasive tumors initially present as muscle invasive lesions
- 50% have metastatic disease at diagnosis

Tumor stage, more than grade, determines management
Tumor Stage

**Superficial Disease**
- Ta
- Tis

**Invasive Disease**
- T1
- T2
- T3
- T4

**Non-Cystectomy**
- Surveillance cystoscopy
- Interval TURBT
- Intravesical BCG
- Intravesical chemotherapy

**Radical Cystectomy**
- Neoadjuvant chemotherapy
- Radiation therapy
- Partial cystectomy
- Bladder-sparing protocol
Tumor Stage

Superficial Disease  
Initial tumor  
Small (< 3 cm)  
Solitary lesion  
No CIS  
Low Grade  
BCG naive

Invasive Disease  
Recurrent tumor  
Large (> 5 cm)  
Multiple lesions  
CIS present  
High grade  
failed BCG

Non-Cystectomy  
Radical Cystectomy
Surgical Procedures

Superficial Disease

• TURBT
• Perineal Urethrostomy
• Closure Cystotomy

Invasive Disease

• Partial Cystectomy
• Radical Cystectomy
• Urinary Diversion
TURBT

• Electrocautery or Bipolar?
• NSS, sterile water, or glycine?
• Continuous or non-continuous flow?
• White light or blue light?
• Catheter? Fr. size? 2-way or 3-way?
• Regular, Coude, Councill?
• 10 cc or 30 cc balloon?
• Fill balloon with saline or water?

wtf?
TURBT

Complications:

- bladder perforation
- obturator reflex
- urinary ascites
- hyponatremia
- bleeding
- clot retention
Perioperative Intravesical Chemotherapy

- single dose instillation of chemotherapeutic agent
- mitomycin-C most common
- kills renegade tumor cells
- 39% decrease in recurrence
- intraoperative and postoperative precautions required

Sylvester: J Urol, 2004
Perineal Urethrostomy

Male patients with:

- Anterior lesions
- Fixed prostate
- Penile prosthesis
- Above-average phallic length
Perineal Urethroscopy

Male patients with:

- Anterior lesions
- Fixed prostate
- Penile prosthesis
- Above-average phallic length

Instrumentation:

- Basic minor set-up
- Short midline perineal incision
Closure Cystotomy

- In event of bladder perforation, obtain intraoperative cystogram
- *Extra-peritoneal* bladder perforations managed conservatively:
  - bladder decompression
  - consider CBI
  - antibiotics
Closure Cystotomy

• In event of bladder perforation, obtain intraoperative cystogram

• *Intra-peritoneal* bladder perforations require emergent repair:
  
  - low midline incision
  - suture repair cystotomy
  - intra-abdominal drain
  - bladder decompression
Radical Cystectomy

In males includes surgical removal of:

- urinary bladder
- distal ureters
- prostate gland, seminal vesicles
- urethra (when indicated)
- internal / external / common iliac lymph nodes
Radical Cystectomy

In females includes surgical removal of:

- urinary bladder
- distal ureters
- urethra
- anterior vagina
- cervix, uterus, fallopian tubes
- ovaries
- internal / external / common iliac lymph nodes
Radical Cystectomy

- Typical intra-abdominal procedure
- Females dorsal lithotomy
- Males supine, unless urethrectomy
- Recurrence rate male urethra 10%
- Indications for male urethrectomy:
  - diffuse CIS
  - prostatic stromal involvement
  - frozen section prostatic apex +
Male Urethrectomy

- Dorsal lithotomy position
- Midline perineal incision
- Urethra dissected first distally
- Amputate urethra at glans
- Proximal dissection en bloc with prostatic apex
Radical Cystectomy

• Robotic radical cystectomy has been described
• Lower EBL, transfusion rates
• Diversion typically done open
• Hospital stay similar to open
• Inferior results for locally advanced disease
• Increased cost in most series
• Ultimate role still being clarified

Li: Ca. Treat. Rev, 2013
Radical Cystectomy

- neo-adjuvant chemotherapy now standard of care
- platinum-based
  - *cis-platinum*, *gemcitabine* (CG)
  - *cis-platinum*, *vincristine*, *methotrexate* (CMV)
  - CMV + adriamycin (MVAC)
- 2-3 cycles
- 5-10% improved 5 year survival

<table>
<thead>
<tr>
<th>Stage</th>
<th>5-year Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>T0</td>
<td>98%</td>
</tr>
<tr>
<td>T1</td>
<td>88%</td>
</tr>
<tr>
<td>T2</td>
<td>63%</td>
</tr>
<tr>
<td>T3</td>
<td>46%</td>
</tr>
<tr>
<td>T4</td>
<td>15%</td>
</tr>
</tbody>
</table>

*Grossman: NEJM, 2003*
Partial Cystectomy

- select anterior / dome lesions
- mapping biopsies indicated
- urothelium at risk
- neoadjuvant chemotherapy
- requires ongoing surveillance
- may require radical cystectomy at future date
- survival outcomes similar to radical cystectomy
Over 30 different types of urinary diversion have been described.

All are variants of only 3 basic forms of urinary reconstruction:

- **Incontinent** ileal conduit
- **Continent** Indiana pouch
- **Neobladder** Hautmann pouch
Urinary Diversion

General principles of urinary diversion:

• Interrupted suture
• Absorbable material
• No staples in contact with urine
• Atraumatic ureteral manipulation
• Stent all repairs
• Liberal use of drains
Ileal Conduit

Incontinent Diversion

- 8-10 cm segment of distal ileum
- any bowel segment *except* jejunum
- isolation from GI tract
- proximal end closed
- distal end stomal creation
- iso-peristaltic orientation
- uretero-intestinal anastomoses
Indiana Pouch

Continent Diversion

- principle is the creation of continent urinary reservoir
- requires “catherizable” limb
- utilizes right colon, distal ileum
- ileocecal valve provides continence
- “dry” stoma RLQ or umbilicus
- introduces dwell time
Indiana Pouch

Continent Diversion

- maintains body image
- diligent catheterization
- pouchitis, UTI
- urinary stones
- electrolyte problems
- chronic diarrhea
- B-12 deficiency
Hautmann Pouch

Neobladder

- continent ileal reservoir
- 70 cm segment ileum
- detubularize, reconfigure
- ineffective peristalsis

Hautmann: J Urol, 1988
Hautmann Pouch

Neobladder

• absorbable suture closure of adjacent bowel wall
• urethrovesical anastomosis
• fold “bowel plate” to create pouch
• uretero-intestinal anastomoses

Hautmann: J Urol, 1988
Hautmann Pouch

Neobladder

- 25% retention
- 15% incontinence
- mucous-uria
- nocturnal enuresis common
- electrolyte abnormalities
- B-12 deficiency

Studer: Euro Urol, 1991
That's all Folks!