Bladder Cancer

Clinical Case Conference
Clinical Case

- 89 yo M with gross hematuria

- Labs:
  - Chem: BUN/Cr increased 22/1.27
  - CBC: H/H 13/36, WBCs wnl
  - UA: >50 RBCs, otherwise wnl
  - UCx: No growth

- Cystoscopy at OSH showed bladder tumor
Work-up

- 3/27/12: CT urogram \(\rightarrow\) 2.6x1.4 cm soft tissue mass with irregular borders at the right ureterovesical junction; moderate hydroureter and hydronephrosis (R>L); no distant mets

- 3/27/12: CT chest negative for mets

- 4/2/12: Cystoscopy with biopsy by Dr. Parsons \(\rightarrow\) high-grade invasive urothelial carcinoma

- 4/26/12: TURBT \(\rightarrow\) large tumor involving the bladder trigone with bilateral ureteral orifice involvement. Pathology showed high grade TCC (papillary urothelial carcinoma) with invasion of muscularis propria

- 4/26/12: bilateral ureteral stents placed
Clinical Case

- PAST MEDICAL HISTORY:
  - Hypertension
  - Cholecystitis
  - TB, treated 35 years ago

- PAST SURGICAL HISTORY:
  - Open cholecystectomy, 1998

- MEDICATIONS:
  - Tamsulosin
  - Nifedipine
  - Atenolol
Clinical Case

- **SOCIAL HISTORY:**
  - Immigrated to U.S. from Korea in 1976 and worked in shipyards and later, as a janitor.
  - He is married and has two adult children.
  - Patient has *never smoked*. Occ beer.

- **FAMILY HISTORY:** No known cancer.
Clinical Case – CT urogram
# Epidemiology

**US:**

- Median age at dx → 70yo
- 75% are male
- Whites 2x more than blacks or hispanics

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**TABLE 64.1 2008 UROLOGICAL CANCER INCIDENCE AND MORTALITY WORLDWIDE**

<table>
<thead>
<tr>
<th>Cancer Site</th>
<th>Cases</th>
<th>All Cases (%)</th>
<th>Deaths</th>
<th>All Deaths (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostate</td>
<td>899,102</td>
<td>7.1</td>
<td>258,133</td>
<td>3.4</td>
</tr>
<tr>
<td>Bladder</td>
<td>382,660</td>
<td>3.0</td>
<td>150,282</td>
<td>2.0</td>
</tr>
<tr>
<td>Kidney</td>
<td>273,518</td>
<td>2.2</td>
<td>116,368</td>
<td>1.5</td>
</tr>
<tr>
<td>Testis</td>
<td>52,323</td>
<td>0.4</td>
<td>9,874</td>
<td>0.1</td>
</tr>
<tr>
<td>All cancers</td>
<td>12,662,554</td>
<td></td>
<td>7,564,802</td>
<td></td>
</tr>
</tbody>
</table>

Data from GLOBOCAN [http://globocan.iarc.fr](http://globocan.iarc.fr)
Epidemiology

- Risk factors
  - **Tobacco smoking (esp cigarette)**
  - Aromatic amines (dyes, paints, solvents, leather dust, inks, rubber, and textiles)
  - Prior radiation therapy
  - Prior chemotherapy (Cytoxan)
  - Chronic trauma (long-term indwelling catheters)
  - *Schistosoma haematobium* infection (bilharziasis) in Africa, particularly in Egypt
Economics

- Bladder cancer is **underfunded**

- - - funding if resources shared equitably

(Lung cancer funding is so bad it is off the chart.)
Muscle Invasive

- T1a—microscopic invasion of perivesical tissue
- T3b—macroscopic invasion of perivesical tissue (extravesical mass)
- T3a—microscopic invasion of perivesical tissue
- T4a—invansion of prostate, uterus, vagina
- T4b—invansion of pelvic well, abdominal wall
## Lymph node involvement

<table>
<thead>
<tr>
<th>Stage</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>~20%</td>
</tr>
<tr>
<td>pT1</td>
<td>5%</td>
</tr>
<tr>
<td>pT2-T3a</td>
<td>30%</td>
</tr>
<tr>
<td>pT3b</td>
<td>64%</td>
</tr>
<tr>
<td>pT4</td>
<td>50%</td>
</tr>
</tbody>
</table>

N staging

N1-N2 = Regional lymph nodes = true pelvis
  perivesical → hypogastric, obturator, external iliac, presacral

M1 = above aortic bifurcation

N3 = Common iliac nodes
# Staging – AJCC 2010 (7th)

## TNM staging system for bladder cancer

<table>
<thead>
<tr>
<th>Primary tumor (T)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX</td>
<td>Primary tumor cannot be assessed</td>
</tr>
<tr>
<td>T0</td>
<td>No evidence of primary tumor</td>
</tr>
<tr>
<td>Ta</td>
<td>Noninvasive papillary carcinoma</td>
</tr>
<tr>
<td>Tis</td>
<td>Carcinoma in situ: &quot;flat tumor&quot;</td>
</tr>
<tr>
<td>T1</td>
<td>Tumor invades subepithelial connective tissue</td>
</tr>
<tr>
<td>T2</td>
<td>Tumor invades muscularis propria</td>
</tr>
<tr>
<td>pT2a</td>
<td>Tumor invades superficial muscularis propria (inner half)</td>
</tr>
<tr>
<td>pT2b</td>
<td>Tumor invades deep muscularis propria (outer half)</td>
</tr>
<tr>
<td>T3</td>
<td>Tumor invades perivesical tissue</td>
</tr>
<tr>
<td>pT3a</td>
<td>Microscopically</td>
</tr>
<tr>
<td>pT3b</td>
<td>Macroscopically (extravesical mass)</td>
</tr>
<tr>
<td>T4</td>
<td>Tumor invades any of the following: prostatic stroma, seminal vesicles, uterus, vagina, pelvic wall, abdominal wall</td>
</tr>
<tr>
<td>T4a</td>
<td>Tumor invades prostatic stroma, uterus, vagina</td>
</tr>
<tr>
<td>T4b</td>
<td>Tumor invades pelvic wall, abdominal wall</td>
</tr>
</tbody>
</table>
### Regional lymph nodes (N)*

<table>
<thead>
<tr>
<th>Stage</th>
<th>Lymph nodes</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>NX</td>
<td>NX</td>
<td>Lymph nodes cannot be assessed</td>
</tr>
<tr>
<td>N0</td>
<td>N0</td>
<td>No lymph node metastasis</td>
</tr>
<tr>
<td>N1</td>
<td>N1</td>
<td>Single regional lymph node metastasis in the true pelvis (hypogastric, obturator, external iliac, or presacral lymph node)</td>
</tr>
<tr>
<td>N2</td>
<td>N2</td>
<td>Multiple regional lymph node metastasis in the true pelvis (hypogastric, obturator, external iliac, or presacral lymph node metastasis)</td>
</tr>
<tr>
<td>N3</td>
<td>N3</td>
<td>Lymph node metastasis to the common iliac lymph nodes</td>
</tr>
</tbody>
</table>

### Distant metastasis (M)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>M0</td>
<td>No distant metastasis</td>
</tr>
<tr>
<td>M1</td>
<td>Distant metastasis</td>
</tr>
</tbody>
</table>

### Anatomic stage/prognostic groups

<table>
<thead>
<tr>
<th>Stage</th>
<th>Tis</th>
<th>T1</th>
<th>T2a</th>
<th>T2b</th>
<th>T3a</th>
<th>T3b</th>
<th>T4a</th>
<th>T4b</th>
<th>Any T</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>T1a</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N1-3</td>
</tr>
<tr>
<td>I</td>
<td>T1</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N1-3</td>
</tr>
<tr>
<td>II</td>
<td>T2a</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>T2b</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>T3a</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>T3b</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>T4a</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>T4b</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N0</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Any T</td>
<td>N1-3</td>
<td>Any N</td>
<td>M0</td>
<td>M0</td>
<td>M0</td>
<td>M0</td>
<td>M0</td>
<td>M1</td>
<td></td>
</tr>
</tbody>
</table>

Note: cCTNM is the clinical classification, pTNM is the pathologic classification.

* Regional lymph nodes include both primary and secondary drainage regions. All other nodes above the aortic bifurcation are considered distant lymph nodes.

Used with the permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the AJCC Cancer Staging Manual, Seventh Edition (2010) published by Springer New York, Inc.
Clinical Presentation

- Painless hematuria (75%)
- UTI
- Irritative/obstructive voiding symptoms
Workup

1) H&P, CBC, UA, Ucx +/- urine cytology
   ◦ UA: RBCs, no casts
   ◦ Urine cytology: 34% sensitive, 98% specific

2) Cystoscopy w/ biopsy

3) Upper urinary tract imaging
   ◦ CT urography > U/S & IV pyelography
   ◦ MRI if patient can’t receive contrast
Workup

4) CT/MRI abd/pelvis before TURBT

5) Metastatic workup (muscle invasive):
   ◦ Chest imaging
   ◦ Bone scan if sxs or elevated alk-phos

PET:
   ◦ FDG not used because conc in urine
   ◦ $^{11}$C choline – data is poor, difficult to use
   ◦ $^{11}$C acetate, $^{11}$C methionine under investigation
Histology

- Urothelial carcinoma
  - Transitional cell (TCC) ... >90% in US/Europe
- Non-urothelial carcinoma
  - SCC ... 5%
  - Adenocarcinoma ... 1-2%

### Malignancy Grading of Bladder Carcinoma: Old and New Systems*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Papilloma grade 0</td>
<td>Papilloma</td>
<td>Papilloma</td>
</tr>
<tr>
<td>Papilloma with atypia grade 1</td>
<td>TCC grade 1</td>
<td>Papillary urothelial neoplasm of low malignant potential</td>
</tr>
<tr>
<td>Urothelial carcinoma grade 2A</td>
<td>TCC grade 1</td>
<td>Urothelial carcinoma, low-grade</td>
</tr>
<tr>
<td>Urothelial carcinoma grade 2B</td>
<td>TCC grade 2</td>
<td>Urothelial carcinoma, low-grade or high-grade</td>
</tr>
<tr>
<td>Urothelial carcinoma grade 3</td>
<td>TCC grade 3</td>
<td>Urothelial carcinoma, high-grade</td>
</tr>
</tbody>
</table>

Natural History

- Non-muscle invasive (NMIBC)
  - 75-80% of patients
  - Most die of other causes
  - 10-20% progress to muscle invasive

- Muscle invasive
  - Leads to metastasis and death
  - 50% survival at 5yrs regardless of tx

- Metastatic
  - <10% of patients (often previously treated localized disease)
  - Lung, bone, liver most common
  - Median survival 12-18 mon
Non-muscle invasive: **Risk stratify**

EORTC Risk Tables for Predicting Recurrence and Progression in Individual Patients with Stage Ta T1 Bladder Cancer

The provided software implements the EORTC Scoring System and Risk Tables for Stage Ta T1 Bladder Cancer as published in the paper:


They allow the user to estimate the probability of recurrence and progression in patients with stage Ta T1 bladder cancer based on six different factors:

- Number of tumors
- Tumor size
- Prior recurrence rate
- T category
- Concomitant carcinoma in situ
- Grade

*Download the calculator*

(Versions are available for Windows, iPhone/iPad and Android phones/tablets)
Non-muscle invasive: Management

- Risk stratify (EORTC risk calculator)

- TURBT + single dose of mitomycin C and/or additional intravesical chemotherapy.
  - Intravesical Mitomycin C x1 w/in 1 hr
  - High risk or CIS: Intravesical BCG weekly then maintenance

- Surveillance
  - Flex cystoscopy and urine cytology
  - Frequency based on risk
Non-muscle invasive: XRT?

- Multi-center randomized trial in UK
- 210 patients with pT1G3 NXN0 transitional cell

  - Group 1 – unifocal disease and no Tis
    - Arm 1: TURBT + observation
    - Arm 2: TURBT + 60Gy/30 fractions (3- or 4-field) to bladder only.

  - Group 2 – multifocal disease and/or Tis
    - Arm 1: TURBT + BCG or MMC
    - Arm 2: TURBT + 60Gy/30 fractions (3- or 4-field) to bladder only.

Non-muscle invasive: No XRT

Category I recommendations are the least numerous in NCCN guidelines.
NCCN Guidelines Version 1.2013
Bladder Cancer

Clinical Staging

CT3

CT4a

Primary Treatment

Radical cystectomy\textsuperscript{b} and strongly consider neoadjuvant cisplatin-based combination chemotherapy (category 1)
or
Segmental (partial) cystectomy\textsuperscript{b} (highly selected patients with solitary lesion in a suitable location; no Tis) and consider neoadjuvant cisplatin-based combination chemotherapy\textsuperscript{m}
or

Breast preservation\textsuperscript{b} following maximal TURBT with concurrent chemotherapy\textsuperscript{m} + RT\textsuperscript{m} (category 2B)\textsuperscript{o}
or
For patients with extensive comorbid disease or poor performance status:
TURBT alone\textsuperscript{b} or
RT + chemotherapy\textsuperscript{m,n} or
Chemotherapy alone\textsuperscript{m}

Evaluate after 40-50 Gy, at completion of RT, or at 3 mo with:
- Cystoscopy,
- Prior tumor site biopsy or TURBT,
- Cytology and imaging of abdomen/pelvis

Adjuvant Treatment

Consider adjuvant chemotherapy\textsuperscript{m} (category 2B) based on pathologic risk (pT3-4, positive nodes) if no neoadjuvant treatment given

Consider adjuvant RT\textsuperscript{n} (category 2B) or chemotherapy\textsuperscript{m} (category 2B) based on pathologic risk (pT3-4, positive nodes, positive margin, high-grade) if no neoadjuvant treatment given

Observation or Completion of RT\textsuperscript{n} up to 66 Gy and Consider adjuvant chemotherapy\textsuperscript{m} (category 2B)

See Follow-up (BL-7)

CT3

CT4a

NEXT SLIDE
XRT vs. Surgery: SPARE trial

- UK SPARE Trial
- Randomized feasibility trial
- T2/T3 transitional cell carcinoma
- Opened 2007
- CLOSED 2009 due to poor accrual
  - (After 30 mon, only 45 patients)
XRT vs. Surgery

- 10-year retrospective review, nonrandomized
- 458 patients undergoing RT or cystectomy in Yorkshire, UK
- Radiotherapy: cystectomy = 3:1
- Overall 10-year survival: 22% RT vs 24% cystectomy (NS)

Selection Criteria

Surgery/Cystectomy

In the US, surgery is viewed as “standard of care” though no evidence it is superior to RT.

Surgery often preferred:
- Multifocal
- Presence of Tis (esp extensive)
- Hydroureter/hydronephrosis
- Subtotal resection

Radiation/Bladder Preservation

“Optimal” candidate:
- Unifocal
- <5 cm
- No hydroureter/hydronephrosis
- Good bladder function
- Visibly complete TURBT

Radiation also preferable for:
- Older, obese, diabetic (anesthesia risk)
- Unable to function s/p cystectomy (elderly)
Radical Cystectomy \( \rightarrow \) Ileal conduit

- Bladder, pelvic lymph nodes, perivesical fat, urethra
- Women: anterior wall of vagina, ovaries and uterus
- Men: prostate and SV are also taken
- Like a long ureter to a stoma

Ileal conduit urinary diversion
Cystectomy → Orthotopic Neobladder

- By 2002, 50-90% of patients were getting neobladder
- Must act like a detrusor muscle
- Ileal > colon because it is distensible → less reflux, urgency, incontinence
- Mucosa adapts… absorption → protection/coating
- Disadvantages:
  - Nocturnal incontinence
  - Can take weeks to months to mature
  - Urethral recurrence?
- Relative contra-indications:
  - Renal disease from long-standing obstruction
  - Liver disease, IBD
  - Prior chemo-RT
  - Elderly
NCCN Guidelines Version 1.2013
Bladder Cancer

CLINICAL STAGING

<table>
<thead>
<tr>
<th>PRIMARY TREATMENT</th>
<th>ADJUVANT TREATMENT</th>
</tr>
</thead>
</table>
| Radical cystectomy\(^b\) and strongly consider neoadjuvant cisplatin-based combination chemotherapy (category 1)
| Consider adjuvant chemotherapy\(^m\) (category 2B) based on pathologic risk (pT3-4, positive nodes) if no neoadjuvant treatment given |
| or Segmental (partial) cystectomy\(^b\) (highly selected patients with solitary lesion in a suitable location; no Tis) and consider neoadjuvant cisplatin-based combination chemotherapy\(^m\) or |
| Consider adjuvant RT\(^n\) (category 2B) or chemotherapy\(^m\) (category 2B) based on pathologic risk (pT3-4, positive nodes, positive margin, high-grade) if no neoadjuvant treatment given |
| or |
| Negative nodes |
| Bladder preservation\(^b\) following maximal TURBT with concurrent chemotherapy\(^m\) + RT\(^n\) (category 2B)\(^o\) or |
| Observation or Completion of RT\(^n\) up to 66 Gy and Consider adjuvant chemotherapy\(^m\) (category 2B) |
| or For patients with extensive comorbid disease or poor performance status: TURBT alone\(^b\) or RT + chemotherapy\(^m\),\(^n\) or Chemotherapy alone\(^m\) |
| Evaluate after 40-50 Gy, at completion of RT, or at 3 mo with: Cystoscopy, prior tumor site biopsy or TURBT, cytology, and imaging of abdomen/pelvis |
| No tumor |
| Resectable |
| Cystectomy\(^b\),\(^f\) (preferred) |
| Consider completion of RT with alternative radiosensitizing chemotherapy\(^m\),\(^n\) and/or alternative chemotherapy\(^m\) |

\(^c\)The modifier “c” refers to clinical staging based on bimanual examination under anesthesia and endoscopic surgery (biopsy or transurethral resection)
Neoadjuvant Chemotherapy

- Neoadjuvant CMV chemo for muscle-invasive bladder cancer: long-term results of BA06 30894 trial
- Randomized phase III trial:
  - 976 patients (20 countries, led by UK)
  - T2-T4a
  - Arm 1: CMV + (XRT or Cystectomy)
  - Arm 2: No chemotherapy + (XRT or Cystectomy)
- **16% reduction in risk of death** with chemo
- Median survival 37 → 44 months with chemo

*JCO 2011.*
Neoadjuvant Chemotherapy

- Meta-analyses (incl 2 large RCTs) show 5% OS benefit at 5 yrs with cisplatin-containing regimens for patients with muscle-invasive bladder cancer

- BUT neoadjuvant chemo still not standard of care.
cT3
cT4a

NEXT SLIDE
Cystectomy vs. RT $\rightarrow$ salvage cystectomy

- Retrospective
- 552 patients (1970-2005)
- Christie Hospital in Manchester, UK

<table>
<thead>
<tr>
<th></th>
<th># of Patients</th>
<th>Median Age</th>
<th>OS at 5yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radical cystectomy</td>
<td>313</td>
<td>62.5 yo</td>
<td>45.5%</td>
</tr>
<tr>
<td>RT $\rightarrow$ salvage cystectomy</td>
<td>239</td>
<td>65.5 yo</td>
<td>42%</td>
</tr>
</tbody>
</table>

- 2/3 retained their bladder

- Conclusion: primary RT with salvage cystectomy does not compromise survival

ChemoRT: NCIC randomized trial

- National Cancer Institute of Canada Clinical Trials Group
- **Prospective randomized** trial (1985-1989)
  - 99 patients with T2-T4b
  - Randomized to:
    - RT alone (40 Gy in 20 fx) or
    - IV cisplatin (3 cycles) with concurrent RT
  - Interim cystoscopy
  - Definitive therapy: RT (addtnl 20 Gy in 10 fx) or cystectomy

ChemoRT: NCIC randomized trial

- Results:
  - Pelvic failure (5-yr): Chemo-RT (40%) vs. RT (59%) (SS)
  - No difference in 3-yr OS

But then ... 1992 study in JCO MVAC >> cisplatin for metastatic bladder
Bladder Preservation – RTOG 8802

- Neoadjuvant combined modality program with selective organ preservation for invasive bladder cancer: Results of RTOG 8802
- Phase II trial
- 91 patients
- MCV x 2 cycles + concurrent RT (39.6 Gy/22) and cisplatin.
- Follow up cystoscopy (4 weeks) and complete urologic evaluation:
  - Complete response: consolidation cisplatin-RT (25.2/14)
  - Persistent tumor: Cystectomy
- pCR 80% → 60% of these kept bladder
- Similar survival between chemoXRT and surgery

Bladder Preservation – RTOG 8903

- 123 patients T2-4aNx s/p maximal TURBT
- **Phase III, randomized**
  - neoadjuvant **MCV** × 2c concurrent cisplatin × 2c + WP 1.8/39.6 Gy vs.
  - same but no MCV
- Both restaged 4 weeks later with cystoscopy, biopsy, EUA, cytology.
- If CR, then 1.8/25.2 Gy boost (total dose 64.8 Gy) + cisplatin × 1c.
- **Stopped early due to MCV toxicity** (14% died).
- **Results**: no significant change in CR, OS, or DMFS.

ChemoRT

- Multicenter, phase III, randomized
- 360 patients with MIBC (T2-T4a, N0)
- RT +/- synchronous 5FU + MMC
  ◦ 55Gy/20 or 64Gy/32

QOL after Bladder Preservation

- Long-term survivors from 1986-2000 RTOG protocols

QOL after Bladder Preservation

- Urodynamics and clinical evaluation:
  - 24 of 32 (75%) had normally functioning bladders
- Symptoms causing distress in the past week:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>No. Moderate or Greater Distress in Last Wk (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
</tr>
<tr>
<td>Urinary:</td>
<td></td>
</tr>
<tr>
<td>Difficult flow</td>
<td>3 (6)</td>
</tr>
<tr>
<td>Painful or burning</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Urgency</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Frequency</td>
<td>4 (9)</td>
</tr>
<tr>
<td>Leaking</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Nocturia</td>
<td>12 (25)</td>
</tr>
<tr>
<td>Worry about not reaching bathroom</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Embarrassment</td>
<td>2 (4)</td>
</tr>
<tr>
<td>Bowel:</td>
<td></td>
</tr>
<tr>
<td>Diarrhea</td>
<td>4 (9)</td>
</tr>
<tr>
<td>Tenderness</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Bleeding</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Abdominal cramping</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Mucus passed from rectum</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Tenesmus</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Urgency</td>
<td>7 (14)</td>
</tr>
</tbody>
</table>
if possible
Palliative RT for Bladder Cancer

- Multicenter, randomized, prospective trial
- 500 patients recruited, 3 mon data available on 272
- 35 Gy in 10 fractions vs. **21 Gy in 3 fractions**
- Results:
  - Bladder sxs improvement 71% vs. 64% (NS)
  - No difference in toxicity

Radiation Technique

- Sim and treat with an empty bladder
- BOOST: Sim and treat full bladder
- Empty rectum
- Dose constraints:
  - Bladder 65Gy to whole bladder but up to 80Gy if 1/3 of bladder spared (QUANTEC V65<50%)
  - Rectum V50<50%
  - Femoral Heads V50<5%
Clinical Case – RT Plan

- 50Gy/25 to whole bladder
- Tumor boost to 64 Gy (200cGy x 7)
  - Partial bladder
- Daily CBCT for IGRT
- No nodal coverage
Clinical Case – Outcome

MOORES UCSD CANCER CENTER

3/6/12  onset of gross hematuria
3/17/12  cysto in LA-->BT
3/27/12  CTU/chest-->bilat hydro, R>L, BT, old TB
4/2/12  cysto-->high-grade UC
4/26/12  TURBT-->muscle invasive high-grade UC
           bilat stents placed
6/4/12  C1D1 MMC 10mg/M2 + 5-FU 500mg/M2/day x 96 hours
7/2/12  C2D1 5-FU only
7/18/12  finish XRT 6400cGy to bladder
9/21/12  cysto-->visual CR, stents out

11/26/12  “He is fully functional and in good spirits!”
          – Patient’s Medical Oncologist
Questions?

- Thank you!