No disclosures

- Except for my love of Neil Diamond and Scotch
ANAL NEOPLASMS
• Uncommon malignancy (2.4% of digestive system cancers)
• ~ 7100 new cases anal cancer in 2013 in US
• Incidence rising worldwide (increased 1.9 fold for men and 1.5 fold for women from 1973-1979 to 1994-2000)
• Histology primarily *squamous cell carcinoma* (can also see adenocarcinomas, melanomas, NET, GISTs, lymphoma, etc)
ANATOMIC CONSIDERATIONS

• 3 regions
  – Skin—outside 5 cm radius
  – Perianal—completely visible and w/i 5 cm radius
  – Anal canal—non visible or incompletely visible

• All clinicians can perform this exam without anoscopy or a clear understanding of anatomic landmarks
LYMPHATIC DRAINAGE

- Above dentate line ➔ superior rectal lymph nodes to inferior mesenteric lymph nodes and laterally to internal iliac nodes
- Below dentate line ➔ inguinal lymph nodes but also inferior or superior rectal lymph nodes
ETIOLOGY

• Strong association with HPV (type 16 and 18 but also 31 and 33)
• HIV positive MSM have 30-80 fold increased rate compared to general population
• Many risk factors consistent with sexual transmission
  – HIV seropositivity
  – Anoreceptive intercourse (ARI)
  – Unmarried status
  – Hx STD
ETIOLOGY

• Other risk factors
  – Anal condyloma (HPV 16, 18, 31, 33)
  – Chronic irritation (eg. Anal fistula)
  – Crohn’s disease
  – Cigarette smoking (2-5 fold increase)
  – Increasing age
  – Immunosuppression (transplant pts) (200 fold increase)
SYMPTOMS

• Pain
• Rectal bleeding
• Itching
• Discharge
• Palpable anal lump
• Palpable inguinal lymph nodes
STAGING

• Careful clinical exam (size of tumor)
• Ultrasound (size of tumor, LN involvement)
• MRI (LN involvement)
• CT chest/abd/pel for metastatic disease (liver, lung)
## NCCN Guidelines Version 1.2015 Staging Anal Carcinoma

### Table 1. DEFINITIONS OF TNM

<table>
<thead>
<tr>
<th>Primary Tumor (T)</th>
<th></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>Tis</td>
<td>Carcinoma in situ (Bowen’s disease, high-grade squamous intraepithelial lesion (HSIL), anal intraepithelial neoplasia II–III (AIN II–III))</td>
</tr>
<tr>
<td>T1</td>
<td>Tumor 2 cm or less in greatest dimension</td>
</tr>
<tr>
<td>T2</td>
<td>Tumor more than 2 cm but not more than 5 cm in greatest dimension</td>
</tr>
<tr>
<td>T3</td>
<td>Tumor more than 5 cm in greatest dimension</td>
</tr>
<tr>
<td>T4</td>
<td>Tumor of any size invades adjacent organ(s), e.g., vagina, urethra, bladder*</td>
</tr>
</tbody>
</table>

*Note: Direct invasion of the rectal wall, perirectal skin, subcutaneous tissue, or the sphincter muscle(s) is not classified as T4.

### Table 2. ANATOMIC STAGE/PROGNOSTIC GROUPS

<table>
<thead>
<tr>
<th>Stage</th>
<th>T</th>
<th>N</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Tis</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>I</td>
<td>T1</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>II</td>
<td>T2</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>IIIA</td>
<td>T1</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T4</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>IIIB</td>
<td>T4</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>Any T</td>
<td>N2</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>Any T</td>
<td>N3</td>
<td>M0</td>
</tr>
<tr>
<td>IV</td>
<td>Any T</td>
<td>Any N</td>
<td>M1</td>
</tr>
</tbody>
</table>

### Regional Lymph Nodes (N)

| NX    | Regional lymph nodes cannot be assessed |
| N0    | No regional lymph node metastasis |
| N1    | Metastasis in perirectal lymph node(s) |
| N2    | Metastasis in unilateral internal iliac and/or inguinal lymph node(s) |
| N3    | Metastasis in perirectal and inguinal lymph nodes and/or bilateral internal iliac and/or inguinal lymph nodes |

### Distant Metastasis (M)

| M0    | No distant metastasis |
| M1    | Distant metastasis |
• Perianal squamous cell carcinoma
  – Surgical resection
    • Wide local excision for smaller tumors
      – Excised with 1 cm margin
      – Tis or T1
      – Little sphincter involvement
    • APR for larger tumors
  – Radiation therapy
    • Increasing application to perianal lesions
TREATMENT

• Perianal squamous cell carcinoma
  – T1 and ? early T2—wide local excision
  – Large T2—radiation therapy to primary lesion and inguinal fields (less morbid and similar control rates)
  – T3, T4, poorly differentiated—radiation therapy to primary lesion and inguinal and pelvic fields
  – Persistent or recurrent dz—APR
TREATMENT

• Anal canal squamous cell carcinoma
  – Historically APR
  – Chemoradiation (combined modality therapy/CMT)
    • Nigro DCR 1974
    • 30 Gy external beam radiation with 5-FU and mitomycin C
    • **Minimum 45 Gy** in 1.8 Gy fractions (25 fractions over 5 wks) with boost up to 54 Gy **plus 5-FU** (Capecitabine) and **mitomycin C** (cisplatin)
    • Equivalent local control and survival rates with preservation of sphincter function and avoidance of colostomy
**Table 20-6.** Result of two randomized trials examining radiation therapy alone and radiation therapy with chemotherapy for anal canal SCC

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Follow-up</th>
<th>Local control (%)</th>
<th>Overall survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>XRT</td>
<td>Chemo XRT</td>
</tr>
<tr>
<td>EORTC¹⁰⁰</td>
<td>110</td>
<td>5 years</td>
<td>50</td>
<td>68</td>
</tr>
<tr>
<td>UKCCC¹⁰¹</td>
<td>585</td>
<td>3 years</td>
<td>39</td>
<td>61</td>
</tr>
</tbody>
</table>
NCCN Guidelines Version 1.2015
Anal Carcinoma

**SURVEILLANCE**

- Inguinal node palpation every 3-6 mo for 5 y
- Chest/abd/pelvic imaging annually x 3 y

**FOLLOW-UP**

- Evaluate in 8-12 weeks with exam + DRE
- Persistent disease
  - Re-evaluate in 4 wks
  - Progression on serial exams
  - No progression or regression on serial exams
  - Continue observation and re-evaluate in 3 mo

- Complete remission
  - Every 3-6 mo for 5 y
    - DRE
    - Anoscopy
    - Inguinal node palpation
    - T3-T4 or inguinal node positive - chest/abd/pelvic imaging annually for 3 y

- Progressive disease
  - Biopsy proven
  - Restage
  - Locally recurrent
  - Metastatic disease
  - Abdominoperineal resection (APR)
  - 5-FU/Cisplatin

**TREATMENT**

- If progression
  - Continue observation and re-evaluate in 3 mo

- Local recurrence
  - APR + groin dissection, if positive inguinal nodes
  - Groin dissection
  - Consider RT, if no prior RT to groin ± chemotherapy
  - Cisplatin-based chemotherapy or Clinical trial

- Distant metastasis
  - Clinical trial
RECTAL NEOPLASMS
• A common malignancy
• > 40 000 new cases rectal cancer in 2013 in US
• Incidence decreasing in US (from 60 per 100 000 in 1976 to 46 per 100 000 in 2005)
• Mortality decreased by 35% from 1990 to 2007
• Histology primarily adenocarcinoma
ANATOMIC CONSIDERATIONS

- Confinement of rectum within bony pelvis
- Proximity to vital urinary, vascular, and neurologic structures
- Proximity of distal tumors to anal sphincter complex
RISK FACTORS

• Familial (up to 20%)—Lynch/HNPCC, FAP
• IBD
• Cigarette smoking
• Consumption of red/processed meats
• Alcohol consumption
• DM
• Low levels physical activity
• Obesity/elevated BMI
• ? Vitamin D deficiency
SYMPTOMS

- None
- Rectal bleeding
- Obstructive symptoms
- Pelvic pain
- Weight loss
STAGING

• Total colonoscopy (synchronous lesions)
• Rigid proctosigmoidoscopy (distance of tumor from anal verge; performed by responsible surgeon)
• Complete physical exam
• Assessment of performance status
• Appropriate imaging to determine depth of tumor penetration (T), presence of local LN metastases (N), and distant metastases (M)
# AJCC Staging

## NCCN Guidelines Version 1.2015 Staging Rectal Cancer

### Table 1. Definitions for T, N, M

<table>
<thead>
<tr>
<th>Primary Tumor (T)</th>
<th>TX</th>
<th>T0</th>
<th>T1a</th>
<th>T1b</th>
<th>T1c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary tumor cannot be assessed</td>
<td>No evidence of primary tumor</td>
<td>Carcinoma in situ: intraepithelial or invasion of lamina propria</td>
<td>Tumor invades submucosa</td>
<td>Tumor invades muscularis propria</td>
<td>Tumor invades through the muscularis propria into the pericolectal tissues</td>
</tr>
</tbody>
</table>

### Regional Lymph Nodes (N)

<table>
<thead>
<tr>
<th>N1a</th>
<th>N1b</th>
<th>N1c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metastasis in one regional lymph node</td>
<td>Metastasis in 2-3 regional lymph nodes</td>
<td>Tumor deposit(s) in the subserosa, mesentery, or nonperitonealized pericolectal or perirectal tissues without regional nodal metastasis</td>
</tr>
</tbody>
</table>

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### Table 2. Anatomic Stage/Prognostic Groups

<table>
<thead>
<tr>
<th>Stage</th>
<th>T</th>
<th>N</th>
<th>M</th>
<th>Dukes*</th>
<th>MAC*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>T1a</td>
<td>N0</td>
<td>M0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>I</td>
<td>T1</td>
<td>N0</td>
<td>M0</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>II</td>
<td>T2</td>
<td>N0</td>
<td>M0</td>
<td>A</td>
<td>B1</td>
</tr>
<tr>
<td>II</td>
<td>T3</td>
<td>N0</td>
<td>M0</td>
<td>B</td>
<td>B2</td>
</tr>
<tr>
<td>III</td>
<td>T4a</td>
<td>N0</td>
<td>M0</td>
<td>B</td>
<td>B3</td>
</tr>
<tr>
<td>III</td>
<td>T4b</td>
<td>N0</td>
<td>M0</td>
<td>C</td>
<td>C1</td>
</tr>
<tr>
<td>IV</td>
<td>T1</td>
<td>N2a</td>
<td>M0</td>
<td>C</td>
<td>C2</td>
</tr>
<tr>
<td>IV</td>
<td>T1</td>
<td>N2a</td>
<td>M0</td>
<td>C</td>
<td>C3</td>
</tr>
<tr>
<td>IVA</td>
<td>T2-T3</td>
<td>N2a</td>
<td>M0</td>
<td>C</td>
<td>C1/C2</td>
</tr>
<tr>
<td>IVB</td>
<td>T1-T2</td>
<td>N2b</td>
<td>M0</td>
<td>C</td>
<td>C1</td>
</tr>
<tr>
<td>N1a</td>
<td>T4a</td>
<td>N2a</td>
<td>M0</td>
<td>C</td>
<td>C2</td>
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<tr>
<td>N1b</td>
<td>T3-T4a</td>
<td>N1-N1</td>
<td>M0</td>
<td>C</td>
<td>C3</td>
</tr>
</tbody>
</table>

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Note: cTNM is the clinical classification, pTNM is the pathologic classification. The y prefix is used for those cancers that are classified after neoadjuvant pretreatment (e.g., ypTNM). Patients who have a complete pathologic response are ypT0N0CM0 which may be similar to Stage Group 0 or I. The r prefix is to be used for those cancers that have recurred after a disease-free interval (rTNM).

*MAC is the modified American Joint Committee on Cancer classification.

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STAGING

• Endorectal ultrasound
• MRI pelvis
• Similarly high sensitivities for evaluating depth of tumor penetration (94%)
• ERUS more specific in evaluation of local tumor invasion (86% vs 69%)
• Challenges in accurately evaluating LN involvement
  – ERUS 67% sensitivity, 78% specificity
  – MRI 66% sensitivity, 76% specificity
STAGING

• None of imaging modalities significantly superior with regard to tumor N stage
• ERUS high degree of operator dependence (bad)
• MRI high ability to image soft tissue structures in mesorectum (mesorectal fascia)—useful to predict CRM prior to radical surgery (good)
• MRI can evaluate iliac, mesenteric, or retroperitoneal LN (good)
TREATMENT

• Transanal excision
• Transanal endoscopic microsurgery
• Transabdominal resection (Anterior resection of rectum, Low anterior resection of rectum +/- ostomy)
• Abdominoperineal resection of rectum with permanent colostomy
• Neoadjuvant chemoradiation
• Adjuvant chemotherapy
TRANSANAL EXCISION
TRANSANAL ENDOSCOPIC MICROSDUERY

• Appropriate for selected T1 N0 cancers
  – Small (< 3 cm)
  – Well to moderate differentiated tumors
  – Accessible transanally (< 8 cm or < 18 cm)
  – < 30% rectal circumference
  – No evidence of nodal involvement (for curative intent)

• Full thickness excision
• Avoid tumor fragmentation
• Orient and pin specimen for pathologist
TRANSANAL EXCISION
TRANSANAL ENDOSCOPIC MICRO SURGERY
LIMITATIONS

• Absence of pathologic staging of nodal involvement (T1 up to 11%, T2 up to 25%)
• Higher local recurrence rates (13.2% vs 2.7% for T1)
• More radical resection recommended
  – Positive margins
  – LVI
  – Poor differentiation
  – Invasion into lower third of submucosa (sm3 level)
TRANSABDOMINAL RESECTION

- Anterior resection or Low anterior resection
- Preop (neoadjuvant) chemoradiation may result in tumor downsizing and decrease in tumor bulk
- Sphincter preservation may become possible in cases where initial tumor bulk prevented consideration
- Recommend **Total Mesorectal Excision (TME)**
TOTAL MESORECTAL EXCISION

- En bloc removal of mesorectum, incl vascular and lymphatic structures, fatty tissue, and mesorectal fascia as a “tumor package”
- Sharp dissection
- Spare autonomic nerves
- Bloodless planes
ABDOMINOPERINEAL RESECTION

- En bloc resection of rectosigmoid, rectum, and anus with surrounding mesentery, mesorectum, and perianal soft tissues
- Incorporate principles of TME
- Preferred when tumor directly involves anal sphincter or levator mm
- Loss of anal sphincter and incontinence
ABDOMINOPERINEAL RESECTION

Figure 10-27

Figure 12-3

Mesorectum
Tumor-specific bowel and mesorectum transection
Total mesorectal excision

6-cm margin

Anococcygeal ligament
Ischioanal fossa
External anal sphincter muscle
Ischial tuberosity

Coronary
Lines of dissection
Anus
levator ani muscle
Perineal body
Vagina

levator ani muscle
External anal sphincter muscle
Ischioanal fossa
ABDOMINOPERINEAL RESECTION

- Creation of a permanent colostomy
- Risk of urinary and sexual dysfunction
NEOADJUVANT CHEMORADIATION

• Recommended for stage II or stage III rectal cancers due to relatively high risk of locoregional recurrence
• Reduces local recurrence (6% vs 13% for no CMT)
  – Swedish Rectal Cancer trial
• Better local control (7.1% preop vs 10.1% postop at 10 years)
  – German Rectal Cancer trial
• Surgery timed 6-8 weeks after completion
• Complete pathologic response 17%