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Prostate Cancer

- T1: Incidental finding, not palpable and not reliably found on imaging.
- T2: Palpable, confined to prostate (a-c depending on lobes involved etc.)
- T3: Tumor extends through prostate capsule
  - T3a - extracapsular extension
  - T3b - Invading seminal vesicles.
- T4 - Invades adjacent structures.
- N0 or N1 (spread to regional LN's or not)
- M (a-c non-regional LNs, bone etc.)

<table>
<thead>
<tr>
<th>PSA</th>
<th>Low Risk</th>
<th>Moderate Risk</th>
<th>High Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10</td>
<td>10-20</td>
<td>&gt;20</td>
<td></td>
</tr>
<tr>
<td>Gleason Score</td>
<td>&lt;7</td>
<td>7</td>
<td>8-10</td>
</tr>
<tr>
<td>Stage</td>
<td>pT1-pT2a</td>
<td>pT2b-pT2c</td>
<td>pT3-4</td>
</tr>
</tbody>
</table>

Treatment

- "Definitive Treatment", is one of:
  - Radical Prostatectomy (RP) - only if survival >10 years and disease localized to prostate
  - External Beam Radiation Therapy (EBRT)
  - Brachytherapy
- For Extra-prostate disease:
  - Androgen Deprivation Therapy (ADT) + combinations of above
- T1/T2 (localized, low or intermediate risk) (Unchanged survival, 10% progression risk)
  - Active surveillance (can consider if low risk, or poor life expectancy)
    OR
  - Definitive Tx (RP, EBRT, Brachytherapy) - all equal survival.
- T3/T4 or HIGH RISK [us guidelines put high risk here, and not prev bullet point] (40-70% survival @10y)
  - EBRT+ADT (4-6mo) [ or RP+adjuvant EBRT?]
- N >0 or M >0
  - Hormone Therapy / Palliative XRT of mets, can consider combined androgen blockade.
  - Bilateral orchietomy (90% testosterone removal)
  - GnRH agonists (Leuprolide [Lupron or Eligard], goserelin (Zoladex))
  - Estrogens (Diethylestrol - DES)
  - Antiandrogens [bicalutamide (Casodex)]
  - If hormone refractory:
    - Chemo: Docetaxel (or cabazitaxel or sipuleucel-T may improve survival)

- NOTE: Rising PSA level post-definitive therapy --> start ADT!

Lung Cancer

Classification

<table>
<thead>
<tr>
<th>Type</th>
<th>Incidence</th>
<th>Smoking?</th>
<th>Location</th>
<th>Histology</th>
<th>Metastasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenocarcinoma</td>
<td>M:35%, F:40%</td>
<td>Weak</td>
<td>Peripheral</td>
<td>Glandular, mucin producing</td>
<td>Early, disant</td>
</tr>
<tr>
<td>Squamous Cell Carcinoma</td>
<td>30%</td>
<td>Strong</td>
<td>Central</td>
<td>Keratin, intercellular bridges</td>
<td>Local invasion, distant spread, may cavitate</td>
</tr>
<tr>
<td>Type</td>
<td>Incidence</td>
<td>Smoking?</td>
<td>Location</td>
<td>Histology</td>
<td>Metastasis</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------</td>
<td>----------</td>
<td>------------</td>
<td>----------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>SCLC</td>
<td>25%</td>
<td>Strong</td>
<td>Central</td>
<td>Oat Cell, Neuroendocrine</td>
<td>Disseminated @ presentation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Originates in endobronchial cells</td>
</tr>
<tr>
<td>Large Cell Carcinoma</td>
<td>10-15%</td>
<td>Strong</td>
<td>Peripheral</td>
<td>Anaplastic, undifferentiated</td>
<td>Early, Distant</td>
</tr>
</tbody>
</table>

**Staging**

**SCLC Stages:**

<table>
<thead>
<tr>
<th>SCLC Stage</th>
<th>Definition</th>
<th>Treatment</th>
<th>Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited Stage</td>
<td>Confirmed to single radiation port (i.e. one hemithorax and regional LNs)</td>
<td>Radiation ± chemo (+ prophylactic to brain)</td>
<td>1-2 years (12 w/o tx)</td>
</tr>
<tr>
<td>Extensive Stage</td>
<td>Extension beyond a single radiation port</td>
<td>Chemo</td>
<td>6mo (5 w/o tx)</td>
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</tbody>
</table>

**NSCLC Stages:**

<table>
<thead>
<tr>
<th>NSCLC Stage</th>
<th>TNM</th>
<th>Treatment</th>
<th>5 yr survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA</td>
<td>T1a-T1b N0M0</td>
<td>Surgical resection +/− postop adjuvant chemo</td>
<td>50-73%</td>
</tr>
<tr>
<td>IB</td>
<td>T2aN0M0</td>
<td>Chemo</td>
<td>43-58%</td>
</tr>
<tr>
<td>IIA</td>
<td>T1a-T2aN1M0 or T2bN0M0</td>
<td>Chemo</td>
<td>36-46%</td>
</tr>
<tr>
<td>IIB</td>
<td>T2bN1M0 or T3N0M0</td>
<td>Chemo</td>
<td>19-24%</td>
</tr>
<tr>
<td>IIIA</td>
<td>T1a-T2bN2M0 or T3N1-2M0  or T4N0-1M0</td>
<td>Chemo</td>
<td>19-24%</td>
</tr>
<tr>
<td>IIIB</td>
<td>T4N2M0 or T1-4N3M0</td>
<td>Chemo</td>
<td>7-9%</td>
</tr>
<tr>
<td>IV</td>
<td>T1-4N0-3M1a-1b</td>
<td>Chemo</td>
<td>2-13%</td>
</tr>
</tbody>
</table>

- T1a: ≤2cm
- T1b: >2-3cm
- T2a: >3-5cm
- T2b: >5-7cm
- T3: >7cm or carina, heart, great vessels, trachea, esophagus, spine.

- N1: Ipsilateral (Hilar, and intrapulmonary nodes)  
- N2: Ipsilateral (Mediastinal, subcarinal)
• N3: Contralateral

**Metastatic Workup**

- Stage I - Nothing
- Stage II - III: PET, CT thorax/abdo/pelvis, MRI head (CT head if no MRI).
- Stage IV: Same as II-III --> except no PET

**Treatment**

- Stage 1 & 2 --> Mainstay is surgery
  - Adjuvant Chemotherapy --> N1 & N2 (node positive), or big primary tumor with risk of recurrence (i.e. >= 4cm)
- Stage III --> Combined concurrent Radiation (SABRT) + Chemotherapy (platinum-based w/
- Stage IV --> Palliative chemotherapy

**Pancreatic Adenocarcinoma**

- 5 year survival = 5%
- One of the deadliest malignancies (no recent change in life expectancy).
- Screening: NONE exists.
- 80% of newly diagnosed have unresectable disease.
- **Risk Factors:**
  - >50yo
  - Cigarette smoking
  - Chronic pancreatitis (20-fold increase in risk)
  - Hereditary pancreatitis (mutation in cationic trypsinogen gene --> 40% pancreatic cancer) RARE.
- **Symptoms:**
  - ***Painless jaundice*** if tumor is in pancreatic head
    - Typically painless jaundice >50yo = pancreatic or biliary malignancy.
  - B-sx: Anorexia, wt loss.
  - 60% of pts have new or worsening glucose intolerance at time of dx.
  - Body and Tail of pancreas:
    - Back pain (effect on celiac ganglia)
  - **Patients >50yo with idiopathic pancreatitis need CT! (R/O malignancy)**
- **Signs:**
  - Trousseau Sign of Malignancy (migratory thrombophlebitis)
  - Courvoisier Sign (palpable gallbladder from compression of the distal bile duct)
- **Staging:**
  1. **Contrast-Enhanced Multiplanar CT**
     - 90% Sn
     - Small lesions <2cm cannot be seen.
     - Assess vascular invasion, metastatic spread.
     - If no metastatic disease on CT, go onto EUS.
  1. **Endoscopic US (EUS):**
     - Only do if no mets on CT
     - More sensitive than CT (esp if <2cm tumors)
     - Can biopsy
     - **DO NOT do EUS biopsy if resectable disease, can seed needle tract. Indication for direct surgical resection.**
- **Diagnosis:**
  - Biopsy** --> Surgical if resectable, EUS if not resectable.
  - Ca19-9: Help support diagnosis, but not sensitive or specific enough to reliable diagnose.
- **Metastasis:** (Hematogenous)
  - Portal and splenic veins.
  - Vascular involvement of Superior Mesenteric Artery or Celiac axis
  - Liver (Portal vein)
  - Lung
  - Peritoneal
- **Prognosis:**
<table>
<thead>
<tr>
<th>Stage</th>
<th>Findings</th>
<th>Treatment</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Localized disease</td>
<td>No vascular involvement of the celiac axis or SMA; no extrapancreatic metastases</td>
<td>Surgical resection combined with neoadjuvant or adjuvant chemoradiotherapy</td>
<td>20% survival at 5 years</td>
</tr>
<tr>
<td>Locally advanced disease</td>
<td>Vascular invasion of the celiac axis or SMA; occlusion of the portal/SMV; no extrapancreatic metastases</td>
<td>Neoadjuvant chemoradiotherapy, with restaging thereafter</td>
<td>10 months</td>
</tr>
<tr>
<td>Metastatic disease</td>
<td>Extrapancreatic metastases</td>
<td>Palliative chemotherapy</td>
<td>6 months</td>
</tr>
</tbody>
</table>

SMA = superior mesenteric artery; SMV = superior mesenteric vein.

**Management**
- **Surgery** --> only curative intervention for resectable tumors and no metastasis.
  - Cure rate is low even if resectable disease.
  - Post-op care is controversial (older trials used adjuvant chemo+rads, but had methodologic flaws)
    - Recent trial of post-op gemcitabine vs. observation = slight benefit of gemcitabine.
  - Controversial.
- **If involves critical vessels** (SMA, Celiac trunk) --> Combined chemo + radiation
  - (sometimes can convert to resectable disease)
- **Metastatic Disease:**
  - FOLFIRINOX is standard
  - Gemcitabine (6mo alone) with Abraxane (9mo combination)
    - Combining with cisplatin or oxaliplatin increases response rate, but toxic and survival not yet shown.
  - Later trial: 12mo survival:
    - 5-FU, leucovorin, irinotecan, oxaliplatin (FOLFIRINOX) vs. gemcitabine (showed survival benefit 10.5mo vs. 6.9mo for FOLFIRINOX arm, but greater toxicity. Population was extremely fit patients with excellent performance status.
  - Cetuximab and bevacizumab in phase III trial FAILED to improve survival.

**Bladder Cancer**
- Most "urothelial" or transitional cell in origin
- **Risk Factors:**
  - Men > 60
  - Cigarette Smoking (proportional to pack years)
  - Metal, painters, leather
  - *"Field cancerization effect"* - Other transitional cells are at higher risk of cancer - such as renal pelvis
- **Symptoms:**
  - Painless hematuria (gross bleeding = more likely malignancy)
- **Workup:**
  - Look at ALL components of urinary tract
  - CT scan, MRI or IVP (intravenous pyelography)
  - Urine for cytology
  - Cystoscopy:
    - Urine for cytology (some urologists prefer only cystoscopy washings)
    - While cystoscopy --> can resect (TURBT - transurethral bladder resection of tumor)
    - Biopsy other normal-looking areas to rule out field cancerization effect
- If malignant cells found on urine cytology - must biopsy prostatic urethra, bladder, ureters.

**Staging:**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Stage 1 | - T1 tumors  
- Invade submucosa (not muscle) |
| Stage 2 | - T2  
- Muscle invasion, no regional LN involved |
| Stage 3 | - T3-4  
- Locally advanced |
| Stage 4 | - LN involvement + distant metastasis |

**TNM staging basics:**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Ta | - 60% of presentations  
- Low grade papillary tumor |
| Tis | - Carcinoma in situ  
- Greatest risk of muscle invasion |
| T1 | - Invade submucosa |
| T2 | - Invade muscular wall |

**Treatment:**

- **Stage 1** - TURBT (Trans-urethral resection of bladder tumor)
  - Risk of recurrence = number of tumors found, histologic grade, invasion.
  - **HIGH risk of recurrence**
    - Treat with "intravesicular agent" such as BCG Agent (Bacillus Calmette-Guerin)
    - (reduces recurrence, muscle invasion, need for cystectomy, improves survival)
    - 6-week induction + maintenance therapy x1 year
  - **LOW risk of recurrence**
    - Observation OR single dose intravesicular mitomycin or gemcitabine
  - **Follow for recurrence**: cystoscopy q3mo x2y, then q6mo x2y, then yearly
    - If recur --> intravesicular agent.
- **Stage 2** (T2-T4 - muscle invasion)
  - Radical cystectomy (bladder, adjacent pelvic organs, regional LN’s)
    - + non-continent cutaneous urinary diversion.
  - (Can consider partial cystectomy, "bladder-sparing" with chemo/rads sometimes)
  - 75-85% cure rate with cystectomy (20-55% with locally advanced) and 10-20% if LN’s
  - Pre-op cisplatin-based chemotherapy (meta-analysis neoadjuvant chemo = 5% survival benefit)
- **Stage III and Stage IV**
  - Adjuvant chemotherapy
- **Metastatic disease**
  - Survival 8-12mo
  - Palliative platinum-based chemo; response 30-70%
• **Prognosis:**
  ◦ Anatomic (S) stage

**Anal Cancer**

• Typically squamous cell carcinoma.
• Risk Factors:
  ◦ HIV, HPV, etc
• Usually removal of organ not advisable (permanent colostomy needed).
• Typically do chemo + rads --> majority do not need surgery.
• Chemo:
  ◦ Mitomycin (not used in any other disease)
  ◦ 5-FU
• Rads