Bladder Carcinoma
Epidemiology, Etiology and Risk Factors

June 2015
Epidemiology

- Bladder Ca is fourth most common cancer in men and fifth most common malignancy overall \(^1\)

- Incidence of bladder ca is 350,000 per year worldwide \(^2\)

- Incidence of bladder Ca in US 70,000, with 15000 deaths.

- Incidence in white individuals >50years remained stable from 1976-2006.

- Caucasions more likely to develop bladder Ca than other ethnic groups.

- In Malaysia, bladder cancer 6th most common cancer in males, estimated incidence is 4.7%

• Male to female ratio is 4:1

• Increase in incidence with age,
  • men over 70 have 3.7% probability of developing Ca
  • men 60-69 0.92%
  • men 40-59 0.38%
Etiology

- **Acquired factors**
  - Tobacco Smoking
  - Industrial chemicals
  - Radiotherapy
  - Urinary tract infection
  - Gender

- **Genetic Factors**
  - Lynch Syndrome
  - Muir-Torre Syndrome
  - Costello syndrome
• Tobacco smoking

• most well established risk factor

• causes 50-65% of male cases and 20-30% in females¹

• Causal relationship established between exposure to tobacco and cancer²


• incidence of Ca directly related to duration of smoking and number of cigarettes smoked per day\(^1\)

• Significant association for both current and former smokers \(^2\)

• Immediate decrease in risk observed in those who stopped smoking
  • reduction of 40% within 1-4 years of quitting smoking and 60% after 25 years cessation\(^1\)


• Occupational exposure to chemicals
  
  • second most important risk factor for bladder Ca.
  
  • work related cases accounts for 20-25% of all cases
  
  • substances implicated include benzene derivatives and aryl amines (2-naphthylamine, 4-ABP, 4,4’-methyleneedianiline and o-toluidine)
  
  • likely in occupations that are exposed to dyes, rubbers, textiles, paints, leathers and chemicals

• risk due to occupational exposure to carcinogenic aromatic amines significantly greater after 10 years or more of exposure.

• latency period usually exceeds 30 years\(^1,2\)

• in recent years, extent and pattern of occupational exposure have changed because of awareness

• occupational attributed bladder Ca is 7.1% for men and none for women\(^3\)


TABLE 80–1 Aromatic Amines Associated with Urothelial Cancer Formation


<table>
<thead>
<tr>
<th>DEFINITE</th>
<th>PROBABLE</th>
<th>POSSIBLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Aminobiphenyl</td>
<td>4-Chloro-orthotoluidine</td>
<td>4,4′-Methylene bis(2-methylaniline)</td>
</tr>
<tr>
<td>Arsenic</td>
<td></td>
<td>Perchloroethylene</td>
</tr>
<tr>
<td>Benzopyrene</td>
<td></td>
<td>Trichloroethylene</td>
</tr>
<tr>
<td>Benzidine</td>
<td></td>
<td>Tetrachloroethylene</td>
</tr>
<tr>
<td>β-Naphthylamine</td>
<td></td>
<td>4,4′-Methylene bis(2-methylaniline)</td>
</tr>
<tr>
<td>N,N-Bis(2-chloroethyl)-2-naphthylamine</td>
<td></td>
<td>Perchloroethylene</td>
</tr>
<tr>
<td>4,4′-Methylene bis(2-chloroaniline)</td>
<td></td>
<td>Trichloroethylene</td>
</tr>
</tbody>
</table>
• Radiotherapy

  • external beam radiotherapy for gynae malignancies associated with increased rates of secondary bladder ca, relative risk of 2-4.¹

  • incidence ratios for bladder ca after

    • radical prostatectomy 0.99

    • EBRT 1.42

    • brachytherapy 1.10

    • EBRT + BT 1.39 ²


- however patients with prostate ca with intensity-modulated radiotherapy (IMRT) have lower rates of infield bladder and rectal secondary malignancies. ¹

- However long term data still not available

- patients treated with radiation and with a long life-expectancy are at higher risk of developing bladder Ca