

Therapeutic areas – Part 2

Oncology



Module 4 Topic 5_1

Overview of Cancer

- Cancer is the out-of-control growth of cells in the body
- Cancerous (malignant) cells are different from normal cells in many ways because they:
 - Multiply very quickly
 - Keep on multiplying even though the organ they're in doesn't need more cells
 - Look abnormal and usually don't function properly
 - Don't stay where they belong - they invade nearby organs or spread to distant parts of the body (metastasize)



Overview of Cancer

What causes cancer?

- **Genetic mutations**
 - Oncogenes - These are abnormal forms of normal genes
 - Tumor suppressor genes e.g. p53 gene become unable to function
- **Chromosomal abnormalities** can occur through deletion, translocation, or duplication
- **Environmental factors** - Carcinogens include sunlight, tobacco, chemicals, certain viruses, radiation



Overview of Cancer

What causes cancer? (contd)

- **Drugs** e.g. Estrogen & breast cancer, anabolic steroids & liver cancer
- **Dietary substances** e.g. alcohol & risk of head & neck and esophageal cancer; meats cooked at a high temperature & risk of developing stomach cancer



Overview of Cancer

Common types of cancers

- The 5 most common cancers in **men**, from most to least common:
 - Prostate
 - Lung
 - Colon and rectum
 - Bladder
 - Kidney



Overview of Cancer

Common types of cancers

- The 5 most common cancers in **women**, from most to least common:
 - Breast
 - Lung
 - Colon and rectum
 - Uterus
 - Thyroid



Overview of Cancer

How does cancer spread?

- Cancer cells can spread:
 - By expanding directly into nearby tissues or organs
 - By traveling through the lymphatic system or blood vessels to other organs
- Original cancer is called the primary cancer
- Cancer that has spread to other organs is called metastatic cancer



Overview of Cancer

Warning Signs of Cancer

- Weight loss for no known reason
- Tiredness and fatigue
- Night sweats
- New pain that doesn't go away
- A recurring feeling of nausea or vomiting
- Blood in urine or stool
- Change in your stool (too hard or too loose)



Overview of Cancer

Warning Signs of Cancer (contd)

- Fever that keeps coming back
- Cough that doesn't go away
- Changes in the size or color of a mole or spot on skin that doesn't heal
- Larger than normal lymph nodes
- A lump in the breast



Overview of Cancer

Symptoms of cancer

- Pain
- Bleeding - e.g. blood in stools, urine or cough
- Weight loss and weakness
- Neuromuscular symptoms - e.g. pain, tingling, headache, dizziness, changes in vision, seizures
- Lung symptoms - e.g. breathing trouble, cough, pneumonia



Overview of Cancer

Diagnosis of cancer

- **Screening tests** are done if one has a higher risk of having cancer based on the age, sex, family history, health, or lifestyle
- Some common screening tests include:
 - A Pap test for cervical cancer
 - A mammogram (x-ray of breast) for breast cancer
 - PSA test (prostate specific antigen) for prostate cancer
 - Colonoscopy for colon cancer



Overview of Cancer

Diagnosis of cancer

- **Staging tests** include:
 - Imaging tests, such as x-ray, CT and MRI scan, bones scans, and PET scans depending on the type of cancer
 - Biopsy from the tumor or tissues around the tumor
 - Blood tests to see if the liver, bones, and kidneys are working normally



Overview of Cancer

Cancer Treatment Principles

- Major modalities of therapy are –
 - **Surgery** for local and local-regional disease
 - **Radiation therapy** for local and local-regional disease
 - **Chemotherapy** for systemic disease



Overview of Cancer

Chemotherapy

- Treatment **protocols** are standard methods developed by doctors to treat certain types of cancer
- **Cytotoxic drugs**
 - Traditional cytotoxic chemotherapy, which damages cell DNA, kills many normal cells in addition to cancer cells
 - Antimetabolites, such as 5-fluorouracil and methotrexate, are cell cycle-specific and have no linear dose-response relationship
 - In contrast, other chemotherapeutic drugs (eg, alkylating agents) have a linear dose-response relationship, producing more tumor killing as well as more toxicity at higher doses



Overview of Cancer

- **Cytotoxic drugs (contd)**
 - multidrug regimens incorporating drugs with different mechanisms of action and different toxicities are used to
 - increase the tumor cell kill,
 - reduce dose-related toxicity, and
 - decrease the probability of drug resistance
- **Hormonal therapy**
 - uses hormone agonists or antagonists
 - particularly useful in prostate (leuporelin), breast (letrozole, tamoxifen) cancer



Overview of Cancer

Common side effects of chemotherapy

- Nausea or vomiting
- Feeling less hungry than usual
- Weight loss
- Feeling weak and tired
- Diarrhea (frequent, loose, or watery poop)
- Loss of hair
- Mouth or nose sores
- Low blood count (anemia), if the red blood cell count is lowered
- Serious infections, if white cell count is lowered
- Bleeding, if the platelet count is lowered



Overview of Cancer

Combination Cancer Therapy

- A mix of surgery, radiation therapy, and chemotherapy
 - Surgery or radiation therapy can treat a tumor in one part of body, while chemotherapy treats cancer cells that have spread to other parts of body
 - Radiation therapy or chemotherapy can shrink the tumor before surgery, so less of it has to be cut out
 - After surgery, radiation therapy and chemotherapy can help destroy cancer cells that a surgeon couldn't remove
 - Combination chemotherapy can help lengthen life and lessen severity of symptoms

