Physiologic Integrity and Therapeutic Nursing Interventions for Patients with Neoplastic Disorders

Chapter 18
Perspectives in Oncology
Debra Mercer BSN, RN, RRT

"My doctor told me to avoid any unnecessary stress, so I didn’t open his bill."
Cancer/Neoplasm/Malignant Neoplasm/Tumors

- The above terms are often used interchangeably. They are NOT interchangeable.
- Term cancer refers to several disease entities all of which have in common the proliferation of abnormal cells. As a result they may develop new functions, spread and invade uncontrollably and cause death of other cells. Cancer is a term that is used to refer to malignant neoplasms.

Epidemiology

- Study of the distribution and determinants of diseases and health problems is specified populations.
- The goal of the study is the prevention or control of health problems.

Epidemiologic Approach to Cancer

- Evaluate patterns of the disease
- Identify possible causes
- Infers relationships between patterns of disease and determining factors.
- National Cancer Institute (NCI) develops the Surveillance, Epidemiology and End Results (SEER) Program
http://www.nci.nih.gov/  
Statistics are for 1998-2002, are adjusted to the 2000 U.S. standard million population, and represent the number of new cases of Invasive cancer per year per 100,000 of both sexes, males, and females, respectively.

<table>
<thead>
<tr>
<th>Group</th>
<th>Both Sexes</th>
<th>Males</th>
<th>Females</th>
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</thead>
<tbody>
<tr>
<td>African American</td>
<td>512.3</td>
<td>682.6</td>
<td>398.5</td>
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<tr>
<td>White</td>
<td>479.7</td>
<td>556.4</td>
<td>429.3</td>
</tr>
<tr>
<td>Asian/Pacific Islanders</td>
<td>335.6</td>
<td>383.5</td>
<td>303.6</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>352.4</td>
<td>420.7</td>
<td>310.9</td>
</tr>
<tr>
<td>American Ind/Alaska Nat</td>
<td>233.6</td>
<td>255.4</td>
<td>220.5</td>
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**Trends**

- Mortality rates for all cancers excluding lung cancers have been on the decline since 1950’s.
- Mortality rates of all cancers have been on the decline since 1991
- Factors to explain the decline might be:

**Pathophysiology of Cancer**

Cancer develops at the molecular level and may begin with mutations or damage of one or more genomes. Cancerous cells differ from normal cells in appearance, growth and function. The change from normal to neoplastic cells is a process, not a single event. Series of events that generally occur over many years.
**Carcinogenesis**

- Normal cells
  - Genotoxic injury from exposure to genotoxic agents or from random errors in DNA replication

Some normal cells are converted to pre-cancerous cells:

- Genotoxic injury (or injuries) from exposure to genotoxic agents or from random errors in DNA replication
- Exposure to "epigenetic" influences??

A pre-cancerous cell is converted to a cancer cell:

- Time
- Exposure to "epigenetic" influences??

A cancer develops from the cancer cell.

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**Cell Cycle Phases**

- G0: Resting
- G1, G2, S: Growth and normal metabolic roles
- M: Mitotic phase
- Early stage of Prophase
- Late Prophase
- Metaphase
- Anaphase
- Telophase
- Synthesis phase

Growth and preparation for mitosis:

- G2
- Gap 2

DNA replication:

- S

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"The red are for the ill, the blue are for the side effects of the red and the green are for the effects of the blue."
Cancer Characteristics

- Cell Differentiation
- Tumor–Specific Antigens
- Function
- Altered Growth Characteristics
  - Contact Inhibition
  - Doubling Time
- Metastasis (3 stages)
- Angiogenesis

Immune System

- Key role in controlling growth of cancer cells
  - Ability to recognize a pathogen as foreign
  - Ability to mount a response to eliminate the pathogen
- T cells, lymphocytes, macrophages and antigens recognize these cells and destroy them

Genetics

- Cancer is a genetic disease
- Cancer may result from different combinations of a few similar gene mutations
- Genetic mutations
- Environmental Factors
- 34% of adult cancers have a familial basis
- 5%-10% of adult cancers are hereditary
Genetics is Oncology

- Future nursing impact:
  - Provide client teaching or referrals to professionals
  - Shift from caring for symptomatic clients to counseling asymptomatic clients
  - Genetic testing may reveal information that clients find difficult to deal with
  - Nurses will need to understand cancer genetics and apply that knowledge in their clinical practices

Classification of Neoplasms

- Benign and Malignant
  - Tissues of Origin
  - 3 Representative examples of benign neoplasms:
    - Fibromas
    - Lipomas
    - Leiomyomas
  - 3 Representative examples of malignant neoplasms:
    - Carcinoma in situ
    - Malignant fibrosarcomas
    - Bronchogenic carcinomas
Chapter 19

Clients with Cancer
Debra Mercer BSN, RN, RRT

NCI Goals
- Have 75% of health care providers routinely counsel clients on:
  - Tobacco cessation
  - Modification of diet and exercise
  - Screening guideline

Prevention
- Primary Prevention
  - All cancers caused by tobacco and alcohol consumption could be avoided
- Secondary Prevention
  - Early Detection
- Screening
  - It is estimated that 75% of all cancers in the United States could be cured if all available screening tests and self-examination methods were practiced routinely
- Tertiary
Approaches to Cancer Prevention

- Clients' health beliefs can be vital determinants:
  - Education
    - Consists of the client's perception of susceptibility to developing cancer
  - Regulation
    - Prohibiting the sale of tobacco/alcohol to minors
    - Limiting smoking in public places
    - Regulating use of known manufactured carcinogens, prohibiting use of carcinogens in packaged foods
  - Host Modification
    - Possible vaccinations
    - Chemopreventive agents

Prevention and Early Detection of Common Cancers

- Breast Cancer
- Lung Cancer
- Colorectal Cancer
- Prostate Cancer
- Cervical Cancer
- Skin Cancer
Health History

- Detailed Health History
- Psychosocial History
- Head to Toe ** Include every system**

- Detailed History of Chief Complaint

**OLDCART**

- O-onset
- L-location
- D-duration
- C-characteristics of symptoms
- A-associated manifestations
- R-relief
- T-treatment

Clinical Manifestations

- Early stages of cancer
- Cancer can cause many clinical manifestations once the cancer has grown
- Common manifestations secondary to the cancer

Diagnostic Workup

- Variety of Blood Tests
- Tumor Markers
- Basic x-rays
- CT Scans
- MRI

****Only definitive evidence of cancer is with microscopic evidence of malignant cells from the tumor tissue

- Usually obtained from a biopsy
### Laboratory Blood Tests for Cancer

- CBC
- Acid Phosphatase
- ACTH
- Alkaline Phosphate
- Calcium
- LDH
- Parathyroid Hormone
- SGPT (AST)
- SGOT (ALT)
- Testosterone
- Uric Acid

### Tumor Markers

- AFP
- CA-125
- CEA
- HCG
- PSA
- CA-19-9
- Ca-15-3

### Grading of cancer cells

- **Grade 0**: carcinoma in situ (without spread)
- **Grade I or II**: well differentiated and deviate minimally from normal cell
- **Grade III or IV**: poorly differentiated and the most deviated compared to normal cells
Staging (extent of spread) of Cancer

- Diagnostic process involving a systemic search for the characteristics of the primary tumor (T)
- Involvement of lymph nodes (N)
- Evidence of Metastasis (M)
- Known as TNM classifications

Four stages
- I through IV
- 0 for carcinoma in situ (without spread)

Treatment Goals

- Control the cancer by slowing the disease process
- Palliation, or alleviation of disease manifestations
- Rehabilitation to maintain the highest quality of life for as long as possible

Treatment Modalities

- Surgical Management
- Palliative
- Radiation Therapy
  - External Beam Radiation Therapy
  - Internal Radiation Therapy
- Regional Chemotherapy
- Biotherapy
- Clinical Trials
- Bone Marrow Transplantation
Surgical Management

- Surgery can be used as treatment for recurrence, palliative, reconstructive, or preventative
- Diagnostic surgery—through biopsy
  - Cytologic specimens
  - Needle biopsy
    - Fine-Needle Aspiration
    - Core-Needle Biopsy
  - Excisional (Total) biopsy
  - Incisional (Subtotal) biopsy

Radiation Therapy

- Uses high energy ionizing radiation
- Ionizing radiation destroys cell’s ability to reproduce by damaging its DNA inducing apoptosis
- Also causes a chain of chemical reactions in nearby extracellular fluid, forming free radicals

External Beam Radiation (Teletherapy) Therapy

Advantages:
- Skin sparing effect; maximum effects occur at tumor depth in the body and not on the skin surface
- External radiation is painless, you will not need to be given anesthesia.
Internal Beam Radiation Therapy
- High Dose Rate Brachytherapy (HDR)
- Gynecological HDRs
- MammoSite
- Prostate Seed Implants
- Intravascular Brachytherapy (IVB)

Radiation Safety Standards
Protect Yourself
- Distance
- Time
- Shielding
- Patient Teaching

Nurtoons

Help! Help! Call a code!

That’s the nursing director designed to spin around on the floors today.

Of course, the young man in there is already a dummy, so she’s been in there going CR and yelling for help for the last fifteen minutes.

When did you finish telling her that he’s a dummy? Maybe when I get back from work?
Chemotherapy

- Goals
  - Cure
  - Control
  - Palliation

Cell Kill Hypothesis

- Only a percentage of cancer cells are killed with each course of chemotherapy
- Remember cancers are classified according to cell-cycle specific or cell-cycle nonspecific Box 19-1; page 367

Side Effects of Antineoplastic Drugs

<table>
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<tr>
<th>SYSTEM Effects of Chemotherapy</th>
<th>GI</th>
<th>Cardiac</th>
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<tbody>
<tr>
<td>Integumentary</td>
<td>Pulmonary</td>
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</tr>
<tr>
<td>Hematopoietic</td>
<td>Metabolic</td>
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</tr>
<tr>
<td>GU</td>
<td>Reproductive</td>
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<tr>
<td>Hepatic</td>
<td>Neurologic</td>
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</tbody>
</table>
Administration of Chemotherapy

- **Most facilities require you be a chemo certified nurse to administer chemotherapeutic drugs**
- Critical Steps:
  - Verification of drug, dose and administration schedule
  - Remember your “Best Friend” when it comes to drug administration
  - Assure you understand all crucial information regarding drug facts

IV Administration of Chemotherapy Agents

- Almost all chemo drugs are administered via IV:
  - Be aware of extravasation possibilities
  - Vesicant—an agent capable of causing tissue damage
  - Select a large vein in the fleshy part of the arm
- Optimal delivery with less chance of extravasation
  - Use VAD and PICC lines for chemotherapy

VAD (venous access devices)

Page 373 in text
Peripherally Inserted Central Catheter

Handling an Extravasation

General Rules
- Prevention is KEY: Before administration know the vesicant potential of the drug
- Stop the Drug Infusion
- Leave catheter in place
- Aspirate any residual drug from the tubing, needle, site
- Contact Pharmacist
- Administer Antidote
- DO NOT apply direct manual pressure to site
- Apply heat or cold as indicated
- DOCUMENT

Regional Chemotherapy

- Alternative route
  - Allows high concentrations of drugs to be delivered (directed) to localized tumors
- Methods for delivery
  - Topical
  - Intra-arterial
  - Intracavitary
  - Intraperitoneal
  - Intrathecal
Adverse Reaction

- Hypersensitivity Reaction
  - Dyspnea
  - Chest tightness or pain
  - Paresthesia
  - Urticaria
  - Tachypnea
  - Urticaria
  - Hypertension
  - Anxiety
  - Agitation
  - Inability to speak
  - Cloudy mental status
  - Abdominal Pain
  - Nausea
  - Hypotension
  - Cyanosis

Most common neoplastic drugs:
- L-asparaginase: Elspar
- Carboplatin: Paraplatin
- Cisplatin: Platinol-AQ
- Paclitaxel: Taxol
- Bleomycin: Blenoxane
- Teniposide: Vumon

Safe Handling of Chemo

- Exposure may occur from the following 3 routes:
  - Inhalation of aerosols
  - Absorption through the skin
  - Ingestion of contaminated materials

Nursing Management

- Oncology Client
  - Myelosuppression
  - Nadir
  - Neutropenia
  - Thrombocytopenia
  - Anemia
  - Gastrointestinal Effects
  - Skin Effects
Oncologic Emergencies
- Infection
- Pain
- Hypercalcemia
- Tumor Lysis Syndrome
- Syndrome of Inappropriate Antidiuretic Hormone (SIADH)
- Disseminated Intravascular Coagulation
- Spinal Cord Compression
- Superior Vena Cava Syndrome
- Cardiac Tamponade

Nursing Diagnosis for General Cancer Care
- Ineffective Breathing Pattern
- Constipation
- Diarrhea
- Risk for Disuse Syndrome
- Incontinence
- Impaired Urinary Elimination
- Deficient Knowledge
- Acute Pain
- Impaired Physical Mobility
- Sexual Dysfunction
- Chronic Pain
- Impaired Skin Integrity
- Impaired Cardiopulmonary Tissue Perfusion
- Ineffective Peripheral Tissue Perfusion
- Activity Intolerance
- Disturbed Body Image
- Risk for Infection
- Risk for Injury
- Imbalanced Nutrition
- Impaired Oral Mucous Membrane
- Impaired Swallowing

Nursing Care
- Educate yourself and your patient
- Remember you are also generally treating family or significant others as well
- Appropriate Pain Control-teach the patient how to use pain medication
- Make care-plan according to signs and symptoms that are related to the type of cancer and/or treatment
WHAT IS THAT?

IT'S A VODDO DOG, OR A PARTICULAR DOG.

SO WHAT DO YOU DO? POUNCE IT WITH NEEDLES?

WELL, EVEN BETTER: TAKE THIS SHOT-UP NEEDLE AND PUT HER BURDOGS!