Clinical Pearls for the New Advance Provider

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Disclosure Statement

• I have no actual or potential conflict of interest in relation to this program/presentation.
Objectives

• Review the biology and pathology of neoplastic diseases
• Discuss cancer therapies
• Correlate review of systems and implications to physical examination
• Review potential side effects/toxicities of treatment therapies and effects
DNA damage response

- Cellular metabolism
- Viral infection
- Radiation
- Chemical exposure
- Replication errors

Resulting in DNA damage:
- Cell cycle checkpoint activation
- Transcriptional program activation
- DNA repair
- Apoptosis
Cancer Basics

• Series of DNA alterations
  – Divide constantly
  – Divide indefinitely
  – Ignore signals to stop growing
  – Resist cell death
  – Invade spread to other sites
  – Recruit blood vessels

http://www.ch.ic.ac.uk/local/projects/burgoine/origins.txt.html
Etiologic Agents in Cancer

- Tobacco
- Infectious
- Inflammation
- Chemical
- Physical
- Lifestyle
Tobacco

• More than 30% of cancer deaths in the United States are caused by smoking
  – Lung
  – Larynx
  – Nasal
  – Oral cavity
  – Esophagus
  – Liver
  – Pancreas
  – Cervix
  – Bladder
  – Leukemia
  – Colorectal

### Chemical

<table>
<thead>
<tr>
<th>Chemical Factors</th>
<th>Affected Organ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asbestos, silica</td>
<td>Lung, mesothelioma</td>
</tr>
<tr>
<td>Radon, nickel dust, arsenic, chromium</td>
<td>Lung</td>
</tr>
<tr>
<td>EtOH</td>
<td>Oral cavity, esophagus, liver</td>
</tr>
<tr>
<td>Aromatic amines</td>
<td>Bladder</td>
</tr>
<tr>
<td>Cadmium</td>
<td>Prostate</td>
</tr>
<tr>
<td>Benzene</td>
<td>Leukemia</td>
</tr>
<tr>
<td>Smokes, salted, pickled foods</td>
<td>Stomach</td>
</tr>
<tr>
<td>Aflatoxin</td>
<td>Liver</td>
</tr>
<tr>
<td>Estrogen – hormone replacement therapy (HRT)</td>
<td>Breast, endometrial</td>
</tr>
<tr>
<td>Androgen</td>
<td>Prostate</td>
</tr>
<tr>
<td>Immunosuppressant</td>
<td>NHL</td>
</tr>
</tbody>
</table>
### Infectious

<table>
<thead>
<tr>
<th>Infectious Agent</th>
<th>Affected Organ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis C Virus</td>
<td>Liver</td>
</tr>
<tr>
<td>Hepatitis B Virus</td>
<td>Liver</td>
</tr>
<tr>
<td>Epstein Barr Virus</td>
<td>Burkitt lymphoma, nasopharynx, Hodgkin lymphoma</td>
</tr>
<tr>
<td>Herpes Simplex Virus</td>
<td>Kaposi sarcoma, pulmonary effusion lymphoma, Castleman disease</td>
</tr>
<tr>
<td>Human Papillomavirus (HPV)</td>
<td>Anogenital &amp; Oral cavity</td>
</tr>
<tr>
<td>Polyomavirus</td>
<td>Merkel cell carcinoma</td>
</tr>
<tr>
<td>John Cunningham (JC) virus</td>
<td>Progressive multifocal leucoencephalopathy</td>
</tr>
<tr>
<td>Human T-cell lynmphotropic virus (HTLV-1)</td>
<td>Adult T-cell leukemia/lymphoma</td>
</tr>
<tr>
<td>HIV-associated</td>
<td>Kaposi sarcoma, cervix, various NHL</td>
</tr>
<tr>
<td>H. Pylori</td>
<td>Stomach</td>
</tr>
<tr>
<td>Schistosomiasis</td>
<td>Bladder (squamous cell)</td>
</tr>
</tbody>
</table>
### Inflammation – Physical – Lifestyle

<table>
<thead>
<tr>
<th>Inflammation</th>
<th>Affected Organ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute &amp; chronic inflammation contributes to multiple cancers</td>
<td>Reflux esophagitis → Barrett's esophagitis → esophageal cancer</td>
</tr>
<tr>
<td></td>
<td>Liver cirrhosis → Liver cancer, chronic pancreatitis: Pancreas cancer</td>
</tr>
<tr>
<td></td>
<td>Chronic pancreatitis → pancreas cancer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical</th>
<th>Affected Organ</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV Light</td>
<td>Skin cancers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lifestyle</th>
<th>Affected Organ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obesity</td>
<td>Breast, endometrial, prostate, esophagus</td>
</tr>
<tr>
<td>Diet</td>
<td>Complex exposure</td>
</tr>
</tbody>
</table>

How cancer spreads...

• Local invasion
  – Invades nearby

• Intravasation
  – Walls of nearby lymph or blood vessels

• Circulation
  – Lymphatic system and blood stream

• Arrest and extravasation
  – Stop in capillaries in distant locations and migrate

• Proliferation
  – Multiply to form micrometastases

• Angiogenesis
  – Micrometastases form new blood supply

Cancer Diagnosis

• Tissue or Blood
  – Routine histo-pathologic examination
  – Immuno-histo-chemistry for classification
  – Histologic diagnosis and classification of cancer
  – Cytogenetics and flow cytometry
  – Targeted genomic testing
  – Tumor markers
  – Imaging

Treatment

• Diagnosis
  – Liquid
  – Solid

• Stage
  – Surgery?
  – Radiation?
  – Chemotherapy
  – Combined?
  – Targeted
  – Immunotherapy
  – Hormonal
Cancer is so much more than cancer!

- What kind?
- Treatment?
- Side effects?
- Management?
- Scans or reassess?
You hear the word 'cancer,' and you think it is a death sentence. In fact, the shock is the biggest thing about a diagnosis of cancer.

- Clare Balding -
Denial

• This is not real
• There has been a mistake
Anger

• Manifest in different ways
  – Mad at self
  – At situation
Bargaining

- If only I had
- What if I
- Maybe if I just
- I promise I will

(Based on the Grief Cycle model first published in On Death & Dying, Elisabeth Kübler-Ross, 1969. Interpretation by Alan Chapman 2006-2013.)
Depression

• Preparatory grieving

• Acceptance with emotional attachment – starting to accept reality of the diagnosis

• Symptoms
  – Sadness
  – Regret
  – Fear
  – Lack of appetite or changes in appetite
  – Weight loss/Weight gain
  – Insomnia
  – Crying
  – Inability to concentrate
Acceptance

- Varies according to the situation
- May notice emotional detachment and objectivity
Why is this important?

- Insight into the patient
- Knowledge about the disease
- Understanding of the stages of grief
- Review of systems
  - Cancer treatment affects all areas of life
- History physical
- Symptom management
History and Physical

• Demonstrate confidence
  – Foam or wash hands
  – Shake hands
  – Introduce yourself

• Identify patient
  – Have patient identify anyone else in room
  – Document (helps identify at next visit)
  – Why are you here?

• Commonality
Labs

- CBC w/diff
- Chemistry

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\begin{figure}
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\includegraphics[width=\textwidth]{labs.png}
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Constitution

- Fever
- Chills
- Appetite
- Weight loss/gain
- Fatigue
HEENT

• Eyes
  – Watering
  – Blurring
  – Red
  – Itching

• Ears
  – Ringing
  – HOH
  – Fullness

• Nose
  – Running
  – Itching
  – Bleeding

• Mouth
  – Sores
  – Dentures/teeth
  – Tender
  – Candidiasis
Respiratory

- Shortness of breath
- Exertion
- Oxygen
Cardiac

- Abnormal heartbeats
- Pain
- Edema (where?)
Gastrointestinal

• Nausea
  – When
  – Antiemetic’s

• Emesis
  – When
  – Treatment

• Abdominal pain
  – Where
  – Anything better or worse

• Constipation
  – Last bowel movement
  – Frequency

• Diarrhea
  – Number of stools daily
  – Consistency
  – Treatment
Genitourinary

- Urinary pain
- Frequency
- Color
- Burning
- Nocturia
- Changes in stream
Neurological

- Alert and oriented
- Dizziness
- Balance
- Numbing
- Tingling
- Fine motor
Musculoskeletal

- ADL’s
- ROM
- Muscle pain
- Joint pain
Integumentary

- Skin overall
  - Rash
  - Texture
  - Hair distribution
  - Hands
  - Feet
  - Nails
  - Hyper/hypo pigmentation
Psychological

- Anxiety
- Nervousness
- Depressed
- Changes in life style
  - Social interaction
  - Working schedule
  - Insomnia
Examination - Constitutional

• What do you see?
  – Alert
  – Oriented
  – Distress
  – Distracted
  – Affect

• Vital signs
Examination - HEENT

- Scalp
  - Hair
  - Symmetric

- Eyes
  - PERRLA
  - Sclera
  - EMOI

- Neck
  - Lymphadenopathy

- Mouth
  - Teeth
  - Dentures
  - Gums
  - Lesions
Examination - Respiratory

- Lung fields
- Breathing
- Drains/tubes
Examination - Cardiovascular

• Regular or irregular
  – Murmurs
  – Gallops
  – Rubs

• Hydration
Examination - Gastrointestinal

- Bowel sounds
- Soft
- Tender/non-tender
- Nodularity
- Pain
- Distention
- Organomegaly
- Wounds/drains

"I'm afraid that your irritable bowel syndrome has progressed. You now have furious and vindictive bowel syndrome."
Examination - Genitourinary

- Bladder distention
- Foley catheter
  - Color
- CVA tenderness
Examination – Neurological/psychological

- Mood
- Alert and oriented
- Understanding of situation
- Coping strategies
- Judgement
- Affect
- Tremors
Examination - Musculoskeletal

- Ambulation
- Movement
- Strength
  - Equal
Examination - Integumentary

- Face
- Scalp
- Torso
- Hands
- Feet
Pearls

World’s Largest Natural Pearl
75 lbs
Implications and Considerations for the Cancer Patient!

- Blood counts will vary
  - CBC w/differential
    - Nadir
    - Stem cell activators
  - Chemistry
  - Liver function tests
  - Tumor markers
    - PSA, CA125, CA15-3, CEA, CA19-9, LD, Calcium
Neutropenia

- Immune system is compromised
  - Neutropenic
  - Sepsis
    - Pneumonia
    - Bladder infections
    - Catheter infections
Wound healing

- Treatment dependent
  - Chemotherapy
  - Endothelial growth inhibitors
  - Biphosphates
Venous Thromboembolism

- **Virchow triad**
  - Venous stasis
    - Immobility
  - Hypercoagulability
    - Interleukins and tumor necrosis – produced when monocytes or macrophages interact with malignant cells – causing damage to endothelium – causing thrombogenic surface
  - Endothelial injury
    - Catheters
    - Direct tumor invasion
    - Antiangiogenic agents

Superior Vena Cava Syndrome

- SVC
  - Blocked
  - Partially compressed

- Symptoms
  - Difficulty breathing
  - Headaches
  - Facial swelling
  - Venous neck and distended veins of the upper arms and chest
  - Upper limb edema
  - Lightheadedness
  - Cough
  - Edema (swelling) of the neck, called Collar of Stokes
  - Pemberton’s sign

Mucositis

- Baking soda rinses
- Saline rinses
- Magic mouthwash
- Biotene
Hand-Foot Syndrome (HFS) or Palmar-Plantar Erythrodysesthesia (PPE)

- Symptoms include:
  - Numbness
  - Tingling, burning, or itching sensation
  - Redness (resembling a sunburn)
  - Swelling
  - Discomfort
  - Tenderness
  - Rash

- In severe cases:
  - Cracked, flaking, or peeling skin
  - Blisters, ulcers, or sores appearing on your skin
  - Intense pain
  - Difficulty walking or using your hands
Summary

- The reality is...
References