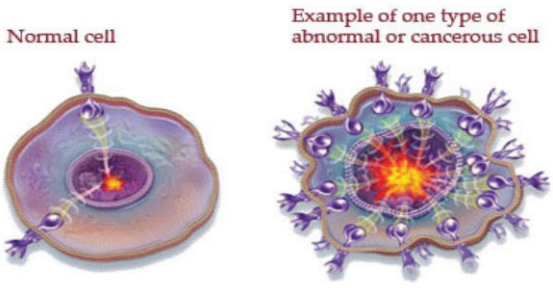
EDUCATION UPDATE

FUNDAMENTALS OF ONCOLOGY

February 12,2026



Allegheny Health Network Cancer Institute

Allegheny Health Network
Fundamentals of Oncology Course

The Fundamentals of Oncology Course is a 4-day introductory course intended for novice clinicians who practice in hematological-medical units, skilled nursing facilities, home care, hospice, radiation oncology and/or cellular transplant. This course may also be applicable to experienced oncology clinicians who require a basic review of oncology diseases and emergencies as well as complications surrounding these processes.

This course is designed to provide the oncology clinicians with basic oncology information and skills that would be applicable to any oncology patient population. The course NCPD can also be applied to the ILNA blueprint for ONCC certifications. Codes have been noted under each lecture. Please keep the course flyer for your ONCC renewal application process.

Course Faculty: This course uses a multidisciplinary approach from the knowledge and expertise of physicians, nurses, clinical nurse specialists, nurse practitioners, managers, genetic counselors, and social workers to provide a comprehensive overview of oncology.

Criteria for earning contact hours

Attendance: Participants are eligible for Nursing Continued Professional Development (NCPD) credits based on the sections they attend. Credits are only offered on the scheduled course dates attended.

Course Materials: Course materials will be distributed at the beginning of each course with additional handouts as necessary throughout the course. Materials include the course schedule, objectives, evaluation form, and content outlines. Post assessment will be provided at the end of each day, with a review conducted at beginning of next class day. Expectation is a passing score of 85%

Course Evaluation: Participants are requested to complete an evaluation for each speaker/lecture. The evaluations will be collected at the conclusion of each day. Feedback will be utilized for subsequent course evaluations.

Activity approval

West Penn Hospital is approved as a provider of nursing continuing professional development by Pennsylvania State Nurses Association, an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation.

Allegheny General Hospital is accredited by the Accreditation Council for Continuing Medical Education to provide continuing education for physicians. Allegheny General Hospital designates this live activity for a maximum of 1.0 AMA PRA category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in this activity

Disclosure Statements

- The planners and presenters have no conflicts of interest to disclose for this activity except:
  - Shelbie O'Hara- Content Creator, Item writer-Oncology Nursing Society
  - Justin Engleka- Highmark Health, Pittsburgh Mobile Footcare
  - Katherine Chorik- Beautox Aesthetics
  - Cyrus Khan- Speakers Bureau – Roche; Beigene; AstraZeneca; AbbVie; BMS; Lily; Pfizer; Kite; ADC Therapeutics
- Any relevant conflicts have been mitigated
- There is no commercial support or sponsors for this educational activity.

Expiration date of enduring material (if applicable) After completion of the live course, enduring materials will be available until December 31, 2026.

Fundamentals of Oncology – Day 2

Thursday February 12, 2026

7:30 a.m. Registration and Review of take-home materials
Mary E. Kern, MSN, RN, OCN, CHSE

8:00 a.m. Neurologic/Spinal Tumors
April DeWeese, RN

8:45 a.m. Head and Neck Tumors
Katherine Chorik, BA, RN, OCN

9:15 a.m. Bone and Soft Tissue Sarcomas
Katherine Chorik, BA, RN, OCN

9:45 a.m. Break

10:00 a.m. Lung Tumors
Mary E. Kern, MSN, RN, OCN, CHSE

10:45 a.m. Bladder, Prostate, and Testicular Tumors
Mary E. Kern, MSN, RN, OCN, CHSE

11:30 a.m. Lunch

12:15 p.m. Esophageal, Gastric, and Colorectal Tumors
Pancreatic, Hepatic, and Neuroendocrine Tumors
Kaitlyn Reeder, PA-C

1:15 p.m. Breast Tumors
Heather Kennihan, MSN, RN, OCN

2:15 p.m. Break

2:30 p.m. Skin Cancers
Jenna Rowe, MSN, CRNP, AOCNP

3:15 p.m. Reproductive: cervical, endometrial, and ovarian Tumors
Quinn Ryan, PA-C

4:00 Wrap up & Evaluations

Learning Outcomes

Upon conclusion of this conference, participants will be able to:

- Explore the genetic basis of inherited cancer syndromes
- Describe the genetic counseling process: referrals, genetic counseling, and genetic counseling
- Explain tumor nomenclature, molecular biology concepts, diagnosis, and treatment principles
- Distinguish the phases and components of clinical research trials
- Recognize Diversity, Equity, and Inclusion (DEI) and how it relates in oncology
- Discuss management of various vascular access devices available for use in patients with cancer
- Summarize care of medical, surgical, hematological, and radiation oncology patients including the common side effects, complications, and management related to treatment modalities
- Examine basic pathophysiology, assessment, diagnosis and treatment interventions of solid tumor, hematologic malignancies, and benign heme disorders
- Review rationale for the use of various blood products and components
- Identify the basic process of autologous, allogenic, haplo, and cord blood transplantation
- Recall radiation terminology and safety principles
- Explain the different radiation treatment modalities: External Beam Therapy, Brachytherapy
- Give examples of radiation disciplines coordinating patient care and treatment
- State principles of radiation treatment planning and process
- Differentiate the various oncologic emergencies and complications that may arise in the immunocompromised oncology patient
- Summarize nutritional issues impacting patients with cancer
- Examine survivorship issues associated with cancer diagnosis and various treatment modalities
- Assess fertility and sexuality issues related to cancer diagnosis and treatment modalities
- Differentiate between hospice and palliative care programs
- Distinguish the treatment modalities for acute , chronic, and oncologic pain
- Integrate coping strategies for clinicians when caring for patients with cancer
- Recommend oncology rehab strategies contributing to survivorship outcomes and quality of life
- Recognize various psycho-social issues pertinent to patients with cancer throughout the continuum of care
- Relate knowledge from course to clinical practice

Neuro-Oncology Nursing

Prepared for Fundamentals of Oncology
Presented by April DeWeese, RN
Neuro Oncology Nurse Navigator
Email: april.Deweese@ahn.org

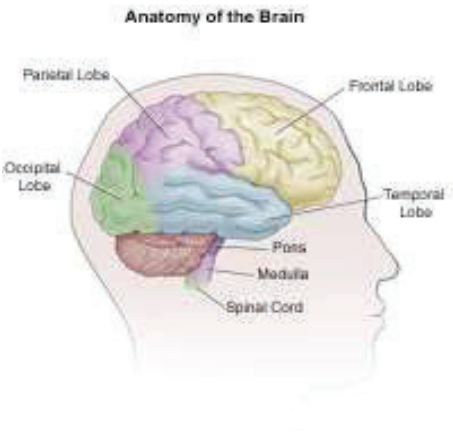
1

Objectives of presentation:

* Review the Pathophysiology, Functions of the Brain.
* Educate on the Signs & Symptoms of Brain Tumors
* Educate on the Epidemiology & Risk Factors of Brain Tumors
* Educate on the Diagnosis & Grading of Brain Tumors
* Discuss the Prominent Types & Genetics of Brain Tumors
* Discuss Treatments of Brain Tumors
* Educate on CNS Lymphoma Diagnosis & Treatment
* Discuss supportive care for patient's & their family or caregivers.

2

Pathophysiology of the Brain



- **Frontal lobe**
  - Reasoning
  - Behavior
  - Memory
  - Personality
  - Mood
  - Judgement

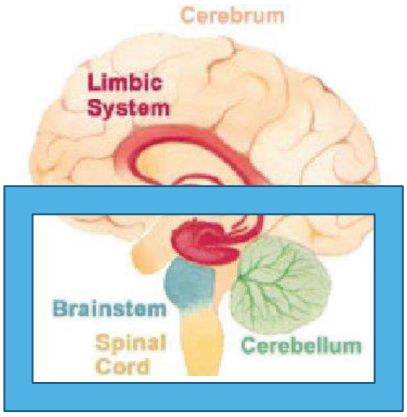
3

Functions of the Brain

- **Parietal Lobe**
  - Calculations
  - Telling right from left
  - Sensations
  - Reading
  - Writing
- **Temporal Lobe**
  - Language comprehension
  - Behavior
  - Memory
  - Hearing
  - Emotions

4

Lower Brain Structures



* **Cerebellum** controls balance, coordination, and fine muscle control
* **Brainstem** regulates breathing, heartbeat, blood pressure, and swallowing
* **Spinal Cord** transmits neural signals between the brain and the rest of the body

5

Signs of Symptoms of Brain Tumors

* Signs and symptoms are generally not specific to the type of tumor , they relate to the problems caused by the lesion.
* They relate to problems caused by the lesion.
  * *Mass effect,* or changes caused by a new mass lesion inside the skull
  * Focal neurologic deficits, or symptoms cause by the specific **location** of the lesion

6

Signs of Symptoms of Brain Tumors

* New Seizure Activity
* Headaches
* Memory Deficits
* Visual disturbances
* Stroke like symptoms:
  * Word-finding difficulties
  * Weakness in extremities
  * Slurred speech
  * Numbness and Tingling
  * Increased falls/difficulty ambulating
* Behavioral disturbances / Personality changes

7

Epidemiology

* In the US, incidence of primary brain tumors is 25 per 100,000
* Roughly 1/3 are malignant
* Per SEER data:
  * 36.4% Meningioma
  * 15.5% Pituitary tumors
  * 15.1% Glioblastoma
  * 8.1% Nerve sheath tumors (neurofibroma, schwannoma)
  * Other tumors make up much smaller proportions

8

Risk Factors for Primary Brain Tumors

- **Familial Syndromes**
  - Neurofibromatosis type 1
  - NF2-related schwannomatosis (also LZTR1 or SMARCB1)
  - Li-Fraumeni Syndrome
  - Lynch Syndrome, CMMRD
  - Familial adenomatous polyposis
  - Von Hippel Lindau syndrome
  - Other rarer syndromes
- **Ionizing radiation exposure (not cell phones)**
- Possibly lower risk in people with allergies
- Not clearly associated with diet, tobacco, Radon gas, occupational exposure, alcohol, infection

9

Diagnosis of Brain Tumors

- Clinical Exam
- Imaging with CT then usually a MRI of the brain
- CT-TAP to rule out metastatic etiology
- Diagnosis must be confirmed with biopsy reviewed by pathologist
- Lumbar Puncture for CSF Cytology studies and to confirm leptomeningeal involvement

10

WHO CNS Tumor Grading

* Different types of tumors can be "graded" based on histology, molecular characteristics, and known clinical behavior
* These tumors are not "staged" as growth and recurrence is almost exclusively within CNS and a TNM-staging system would not be helpful
  * Notable exception is medulloblastoma, which has own staging system
* Grades are from 1-4, with increasing number denoting increasing aggressiveness and worse prognosis as a natural history of the tumor (No longer using roman numerals)
* Traditionally done based on histologic features but now integrates more information

11

Types of Brain Tumors

* Most common brain tumors in adults are metastases from other cancers, not primary brain tumors
  * Most common include lung cancer, breast cancer, melanoma, and renal cancer
* Most common primary brain tumors overall are **meningiomas**, which are most commonly benign but can rarely be aggressive
* Most common malignant primary brain tumor in adults is **glioblastoma**, an aggressive tumor arising from support cells in the brain

12

Types of Brain Tumors

* There are approximately 120 different types of Brain Tumors
* Primary brain tumors are categorized by the type of cell or where in the brain they first develop.

* Most Common Primary Brain Tumors:
  * Meningioma
  * Glioma – most common, form from the glial cells that surrounds the neurons include:
    Astrocytoma
    Ependymoma
    Glioblastoma
  * Mixed Glioma:
    Oligodendroglioma
  * Pituitary Tumor
  * CNS Lymphoma

13

Types of Brain Tumors

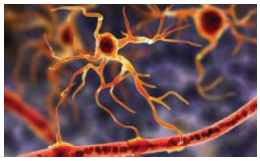
* Meningiomas
  * Tumor that grows on the protective layers of the brain (meninges)
  * Mostly found in the brain, but can occur in the spinal cord
  * Most common type of adult brain cancer
  * Can be benign or malignant
  * Graded 1-3

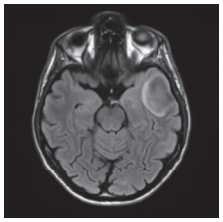
* Risk factors
  * Exposure to radiation
  * A genetic disorder (Neurofibromatosis Type 2)
  * Middle-aged women are more than twice as likely as men to develop a meningioma.
  * Often occur in ages 30-70

14

Types of Brain Tumors

* Astrocytomas
  * Originate from star shaped cells called astrocytes which support the nerve cells of the brain
  * 50% of primary brain tumors are astrocytoma's
  * Classified as a Glioma
  * typically diagnosed in young adults ages 36-38
  * Higher incidence in Males then Females
* Graded 2-4
  * survival Grade 2&3 – 9.3 years
  * Grade 4= 3.6 years
* Very rarely spread outside of the CNS
* Exact cause is unknown





15

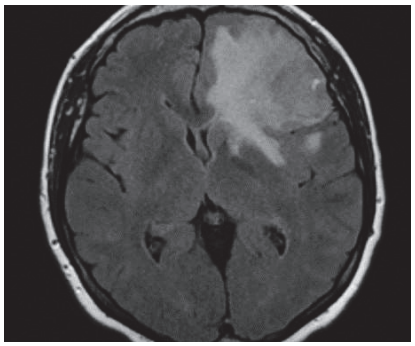
Types of Brain Tumors

* Ependymoma
  * Originates from ependymal cells that line the ventricles of the brain and the center of the spinal cord
  * More common in children than adults
  * Cause weakness in the part of the body controlled by the nerves that are affected by the tumor

16

Types of Brain Tumors

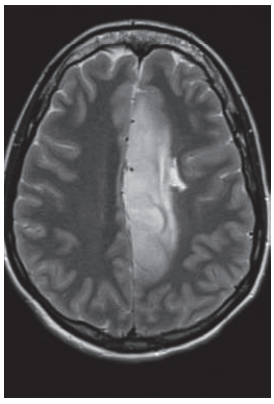
* Glioblastoma Multiforme (GBM)
  * Highest Grade (Grade 4) Astrocytoma
  * Very aggressive, with very poor prognosis
  * Forms on the supportive tissue of the brain
  * Average life expectancy of 14-16 months with treatment (with certain tumor genetics can be 22-31 months)
  * Treated with surgical resection up front, followed by chemotherapy and radiation
  * No known cause or risk factor
  * Affects Men>Women, Older>Younger



17

Types of Brain Tumors

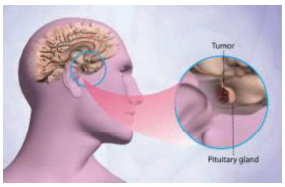
* Oligodendroglioma
  * Mixed Glioma
  * Develop in the cell that produces myelin (the fatty covering that protect the nerves in the brain and spinal chord.
  * 3rd most common glioma
  * Middle aged adults (40's-50's)
  * Characterized by IDH Mutation and 1p19q co-deletion.
  * Can be WHO CNS grade 2 or 3.
  * Gradually increase in grade over time



18

Types of Brain Tumors

* Pituitary Tumor
  * Found in the pituitary gland at the bottom of the brain.
  * Abnormal, noncancerous growth that develops in the pituitary gland.
  * Causes headache, vision loss, nausea, weight loss, feeling cold and weakness.



19

Genetics of Brain Tumors

* 2 main genetic test that are mandatory for molecular alterations at biopsy or surgery are:
  * **IDH Mutation status & co-deletion** of the chromosome arms 1p/19q
    * IDH mutant & 1p/19q define an oligodendroglioma
  * **MGMT Methylation**
    * MGMT gene silencing, or MGMT negative predicts a favorable outcome when treated with an alkylating agent chemotherapy (ex: Temodar)

20

Genetics of Brain Tumors

* We order Next Generation Sequencing (NGS) on most brain tumors. (Grade 2 & 3 meningioma's & WHO Grade 2-4 brain tumors)
* NGS is used to define molecular biomarkers or subgroups of tumors .
* This can assist Neuro Oncology in treatment planning to determine what medication(s) are available to target the biomarkers that are found.

21

Treatment of Brain Tumors

* Surgery (First and best option)
  * brain tumors are most times difficult to completely resect due to location of the tumor.
  * they usually recur due to microscopic cells left behind that the surgeons are unable to see during resection
  * For example: the tumor would be similar to a "palm and fingers." The "palm" would be the part of the tumor the surgeons can see & the "fingers" the microscopic cells left behind.

22

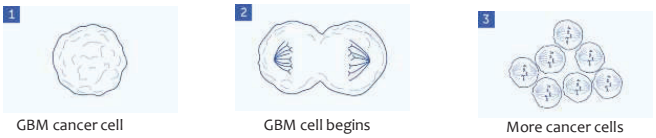
Treatment of Brain Tumors

* Radiation Therapy (Concurrent with Chemotherapy, if patient is stable)
* Chemotherapy (limited options due to blood brain barrier and rarity of disease)
  * Temozolomide (Temodar) is usually the first line of chemotherapy.
  * Avastin can utilized as a second option or when there is progression
  * Vorasidenib (IDH Mutant Low Grade Gliomas)
* Optune Device
* Clinical Trials
* VP Shunt Placement for symptom control
* Surveillance imaging for lower grade tumors and meningiomas
* Gamma Knife Radiosurgery (Brain metastasis or reoccurrence of some primary brain tumors.

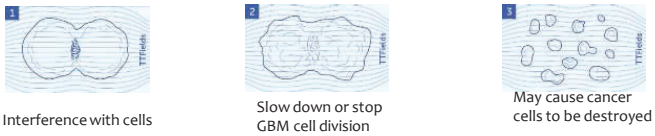
23

Optune Device

* Optune works by creating Tumor Treating Fields (TTFields), which are electric fields that disrupt cancer cell division.



With Optune Device:



24

Optune Device

* Optune should be worn for 18 hours out of the day. Patient has flexibility to decide when to wear.
* It is portable, patient is not required to stay at home.
* It is applied to a shaven head, which seems to be a drawback for many patients. Women more then men.

25

CNS Lymphoma

* Rare cancer that affects the Central Nervous System (CNS)
* Develop in the lymph tissue of the brain or spinal chord.
* Primary CNS Lymphoma (PCNSL) is a rare non-Hodgkin lymphoma restricted to the brain, spinal cord, CSF, and/or eyes
* Progresses and grows very quickly, and can lead to death within weeks or a few months if treatment not started
* Represents 2-4% of brain tumors and has incidence of 0.5 per 100,000 people
* Incidence increases in age and typical age at diagnosis is 65-70 years old

26

CNS Lymphoma

Associated Conditions for CNS Lymphoma:

* HIV
* Organ transplant (PTLD)
* Chronic immunosuppression
* EBV in immunosuppressed population

27

CNS Lymphoma

Disease Management for CNS Lymphoma:

* Current standard is High dose methotrexate-based combination chemotherapy induction, followed by consolidation, often with rituximab
* Many regimens without clear optimal strategy
* High dose methotrexate must be done inpatient and requires 3-5 days of monitoring for clearance and toxicities
* After induction therapy, if there is a good response, consolidation done to prolong response or potentially cure disease
* Due to high mortality with ASCT in older/sicker patients, other options would include whole brain radiation therapy, non-myeloablative chemotherapy, or maintenance therapy

28

Supportive Care

- Patients are susceptible to anxiety/depression/poor sleep.
- Behavioral health/individual or family counseling is always recommended
- Families at very high risk of caregiver burnout
- Financial strain due to inability to work and cost of treatments
- Nutritional considerations (High protein, low carb diets)
- Palliative care/Hospice
- Durable medical equipment
- Home Health
- PT/OT/SLP (Oncology Rehab)
- Transportation (Patient Assistance Fund)
- Placement for higher level of care
- Navigation (Disease site and Community)
- Integrative Medicine

29

Supportive Care

- **Cancer Bridges (cancerbridges.com)**
  - Support groups for patient's & family
  - Individual therapy available
  - Brain tumor group is the 3rd Thursday of each month
- **Young Adult Survivors (yasurvivors.org)**
  - Young adult cancer survivors & caregivers to cope & thrive
    - Support groups
    - Co-survivor support
    - Social activities (in person & virtual)
    - Financial support
    - Grief support

30

Supportive Care

- **American Brain Tumor Association (www.abta.org)**
  - To advance the understanding & treatment of brain tumors
- **Brain Tumor Network** (www.braintumornetwork.org)
  - Trusted source for reliable information about primary brain tumors.
- **End Brain Cancer Initiative** (www.endbraincancer.org)
  - Improve immediate access to advanced treatments, studies, specialists and clinical trials.
- **National Brain Tumor Society** (www.braintumor.org)
  - Unites the brain tumor community to discuover a cure, deliver effective treatments & advocate for the patients and caregivers.

31

Supportive Care

- **Oligio Nation** (www.oligionation.org)
  - Support families that want to overcome and raise money for medical research.
- **American Cancer Society** (www.cancer.org)
  - Improve the lives of people with cancer and their families.
- **Cancer Care** (www.cancercare.org)
  - Provides free, profession support services and information to help manage the emotional, practical & financial challenges of cancer.
- **Triage Cancer** (www.triage cancer.org)
  - Provides free education on the legal & practical issues that may impact individuals diagnosed with cancer & their caregivers.

32

Key points / Summary

* Review the Pathophysiology, Functions of the Brain.
* Educate on the Signs & Symptoms of Brain Tumors
* Educate on the Epidemiology & Risk Factors of Brain Tumors
* Educate on the Diagnosis & Grading of Brain Tumors
* Discuss the Prominent Types & Genetics of Brain Tumors
* Discuss Treatments of Brain Tumors
* Educate on CNS Lymphoma Diagnosis & Treatment
* Discuss supportive care for patient's & their family or caregivers.

Head and Neck Cancer & Thyroid Cancer

Prepared by: Luanne Carletti, BSN RN OCN

Luanne.carletti@ahn.org

Presented by: Katherine Chorik, BA, RN, OCN
Katherine.Chorik@ahn.org

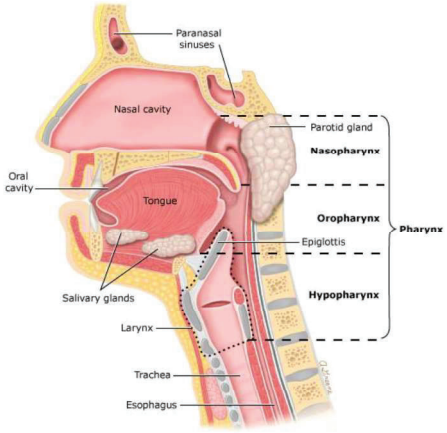
1

Objectives

- Introduce the basics of diagnosis, treatment, and management of patients with HNC and thyroid cancer.
- Enhance clinical knowledge of medical professionals who may interact with and support patients with HNC or thyroid cancer.
- Increase understanding of disease and treatment trajectory to enable clinicians to proactively identify needs and improve patient care

2

Anatomy of the Head and Neck



3

EPIDEMIOLOGY

- Includes a heterogenous group of cancers:
  - Mostly squamous cell carcinoma (>90%)
  - Arise in the mucosal lip, oral cavity, pharynx, larynx, nasal cavity, sinuses, and salivary glands.
- In 2023, the American Cancer Society estimated 66,920 new cases in oral cavity, pharyngeal, and laryngeal will occur in the US (3.4% new cancer cases).
  - 15,400 estimated deaths
  - Rates of HNC are expected to rise, mostly due to increases in oropharyngeal cancer

4

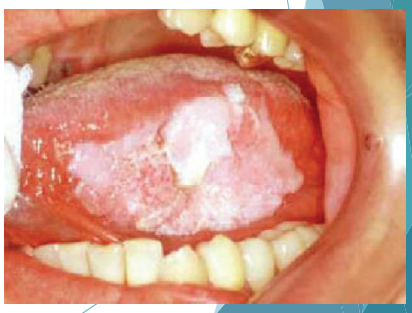
EPIDEMIOLOGY

- Race
  - Caucasian
- Gender
  - Males (2X higher incidence than woman)
- Age
  - Older (Average age of diagnosis is between 55 and 65)
- Major risk factors
  - Smoking and tobacco use separately and in combination with alcohol consumption.
  - Socioeconomically patterned, but socioeconomic risk is not entirely explained by smoking and alcohol behaviors
  - Oncogenic viruses
    - HPV infection (type 16)- oropharyngeal cancer
    - EBV- nasopharyngeal carcinoma
- Other Risk Factors
  - Radiation exposure, prolonged sun exposure, poor nutrition/deficiencies, periodontal disease, immunosuppression, GERD, and other environmental and occupational exposures.

5

Prevention/Screening/Early Detection

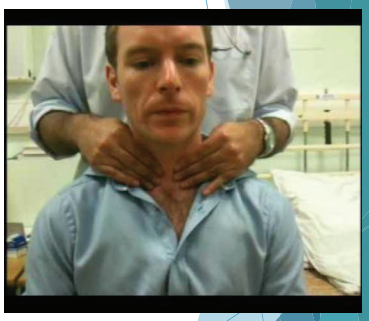
- HPV vaccination
  - Examination with adults age 18-33 showed reduced oral HPV prevalence (0.1% vs 1.6%, p=.008)
- Protection
- Oral Hygiene/Regular dental check ups
- Tobacco (abstinence/quitting)
- Alcohol (decreasing excessive use)
- Proper nutrition



6

Clinical Presentation varies between subsites.

- Often incidental finding by PCP or dentist
- Most common presenting symptoms include
  - Dysphagia (trouble swallowing)
  - Odynophagia (painful swallowing)
  - Otalgia
  - Hoarseness
  - mucosal ulcerations or irregularities
  - oral or oropharyngeal pain
  - weight loss
  - the presence of an unexplained neck mass.



7

Diagnosis involves biopsy and scans

- Biopsy - ENT
  - Primary site or needle bx of neck
- Imaging
  - PET-CT
  - CT Neck
  - CT TAP
  - MRI Neck
- Genetic testing of the tumor
- After testing, the American Joint Committee on Cancer should be followed to determine appropriate TNM staging.

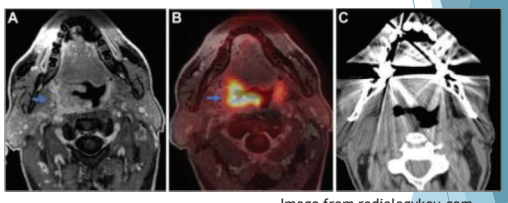


Image from radiologykey.com

8

Staging & Prognosis is based largely on extent of spread.

- Complicated - based upon location/type and P16 status (only oropharyngeal)
  - Patients with locally advanced HPV-positive SCCHN (squamous cell carcinoma of head and neck) have improved response to treatment and survival (OS and PFS) when compared with HPV-negative tumors.
- Stage I or II
  - Relatively small primary w/ no nodal involvement
- Stage III
  - Larger primary, may invade underlying structures and/or spread to one lymph node on the same side of neck as tumor
- Stage IV
  - Cancerous tumor has spread to nearby tissue, bones, organs, or multiple lymph nodes (metastatic)
- Distant mets are uncommon upon presentation (most common sites of mets are lung and brain)
- More advanced = worse survival
- Analysis of patient enrolled in clinical trail RTOG 9003 or 0129 revealed smoking was associated with decreased OS and PFS, regardless of p16 status

9

Treatment of HNC is often multimodal.

- Determined by pathology, staging, ECOG, surgical margins (+/-), and/or extracapsular extension.
- Surgery- primary treatment for HNC
  - Neo-adjuvant
  - Adjuvant
- Chemotherapy / Immunotherapy
- Radiation (IMRT)
- Clinical trials

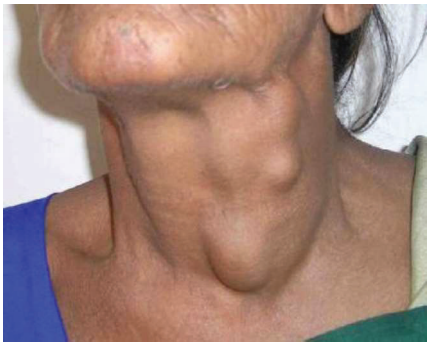
10

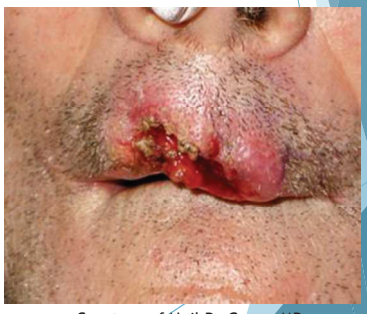
Recovery from treatment is complex and side effects may persist for years

- Oral mucosa
  - Xerostomia(Dry mouth), taste alteration, mucositis
  - Dentist
- Dysphagia- Speech and swallowing
  - SLP rehab
  - PT- difficulty opening mouth
- Pain
- Psychosocial
- Nutrition- many patients get PEG tubes
- Concurrent chemo/radiation – scans obtained 3 months after the completion of radiation
  - Inaccurate results if obtained sooner and not clinically indicated

11

Head and Neck Cancer





Courtesy of Neil D. Gross, MD

12

Care and Survivorship Implications are complex

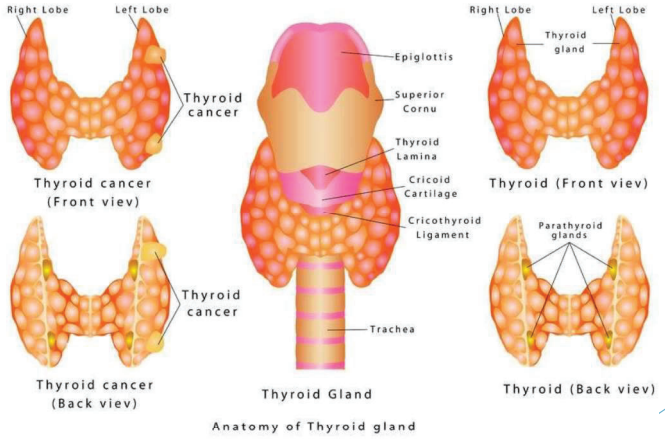
- Many HNC survivors have late and long-term effects from treatment.
- Early intervention is best.
- Some uncommon side effects may largely impact quality of life, so screening for these and getting patients multidisciplinary support is essential.

13

Thyroid Cancer

14

Thyroid Gland

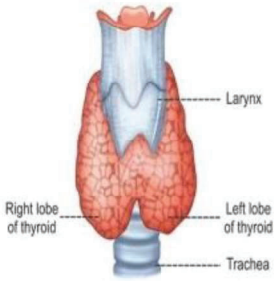


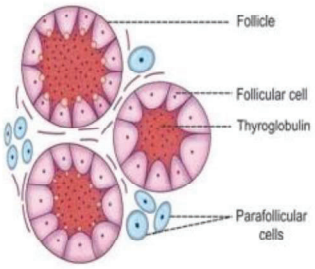
Anatomy of Thyroid gland

15

Histology of Thyroid Gland

- Composed of many closed follicles
  - Epithelial cells lining follicles are called follicular cells
    - Follicular cells secrete thyroglobulin into center of follicle
    - Also secrete T4 and T3
- Between the follicles are parafollicular cells
  - **Secrete calcitonin**



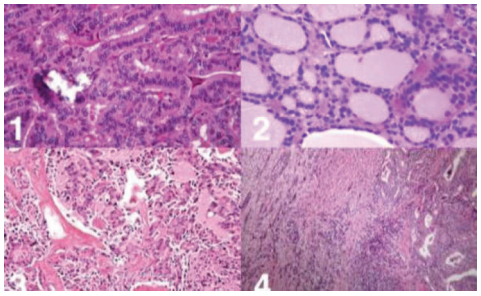


16

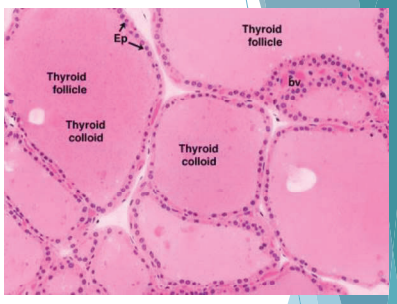
EPIDEMIOLOGY

- Cancer that originates in the thyroid
  - 3 main types
    - Differentiated (papillary, follicular, and Hürthle cell)
    - Medullary
    - Anaplastic (Aggressive)
  - Mostly papillary (about 80%)
- For 2024, the American Cancer Society estimates 44,020 new cases of thyroid cancer will occur in the US.
  - 2,170 estimated deaths
  - Rates were on the rise due to increased detection,rates have decreased about 2% each year since 2014 due partly to more stringent criteria for diagnosing thyroid cancer

17



1)Papillary 2) Follicular
3)Medullary 4)Anaplastic



Regular thyroid tissue

18

EPIDEMIOLOGY

- Race
  - 40-50% less common in Black population than any other racial or ethnic group, Higher risk in children, females, certain Jewish populations, family hx of thyroid carcinoma, Iodine deficiency
- Gender
  - 3x more common in women but more aggressive in males
- Age
  - Younger population, average age of diagnosis is 51
- Risk factors
  - Diseases associated with thyroid carcinoma
    - Familial syndromes (FAP=familial adenomatous polyposis (colon polyps and increased risk of other cancers); Cowden disease; 1st degree relative w/ thyroid cancer (genetic basis not totally clear); obesity
  - Iodine deficiency
    - Associated with follicular and anaplastic
  - Radiation exposure
    - Head/neck xrt as a child
    - Radiation treatments as a child for acne, ringworm of scalp, enlarged adenoids and tonsils (these types of treatments are no longer given due to increased risks)

19

Prevention/Screening/Early Detection

- Most people with thyroid cancer have no known risk factors
- >50% of malignant nodules asymptomatic
- Symptoms can include:
  - Abnormal labwork (TSH, elevated CEA)
  - dysphagia
  - enlarged regional lymph nodes
  - vocal cord paralysis
  - difficulty breathing
  - lump in the neck
  - Constant cough not due to cold

20

Diagnosis

- TSH
- Imaging - used to determine if benign or malignant
  - US Thyroid /US neck
  - Radioiodine
  - Vocal cord exam
- Needle biopsy
  - For advanced, progressive, or threatening disease, genomic testing to identify actionable mutations (including ALK, BRAF, NTRK, and RET gene fusions
- Blood tests
  - TSH (low), T3, T4, Thyroglobulin, calcitonin, CEA

21

Staging

- NCCN guidelines include TNM Staging
- Characteristics of the tumor and patient instead play the more important role in deciding treatment
  - Age of patient
  - Genetics of tumor
  - Location of tumor
  - Etc.

22

Prognosis

Dependent on tumor histology, primary tumor size, local invasion, necrosis, vascular invasion, BRAF V600E mutation status, and metastases.

TYPE	%	ORIGIN	GROWTH	PROGNOSIS
Papillary	75-85	Follicular cells	Slow	Good if confined to thyroid
Follicular	10-20	Follicular cells	Slow	High cure rate
Medullary	3-8	C cells	Slow	Usual regional spread at diagnosis
Anaplastic	2	Follicular cells	Rapid growth and spread	Poor: 4-12 mons. post diagnosis

23

Treatment

- Treatment can include one or varying combinations
  - Determined by pathology, ECOG.
- Surgery
- Radioactive iodine ablation (RAI therapy)
- Hormone therapy
- Chemotherapy/Targeted therapy
- Radiation
- Clinical trials

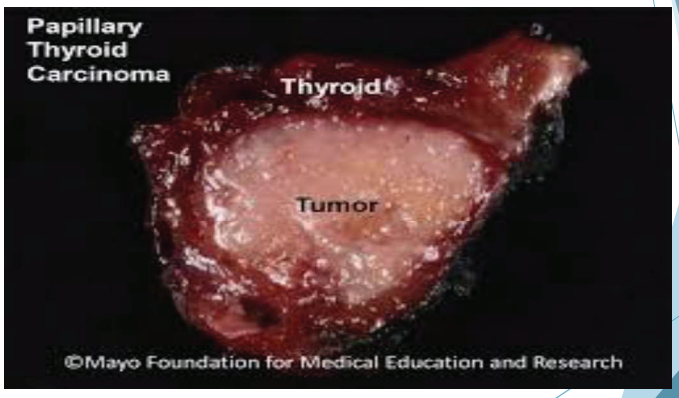
24

Recovery

- Dependent on treatment & can include:
  - Serum Thyroglobulin monitoring
  - Neck US
  - Whole-body iodine imaging
  - CEA monitoring
  - Calcitonin monitoring
  - Nutrition
  - Tracheostomy care

25

Papillary Thyroid Carcinoma



26

Thank you!

References are available upon request

SARCOMA

FUNDAMENTALS OF ONCOLOGY

KATHERINE CHORIK BA,RN,OCN

ONCOLOGY NURSE NAVIGATOR

KATHERINE.CHORIK@AHN.ORG

1

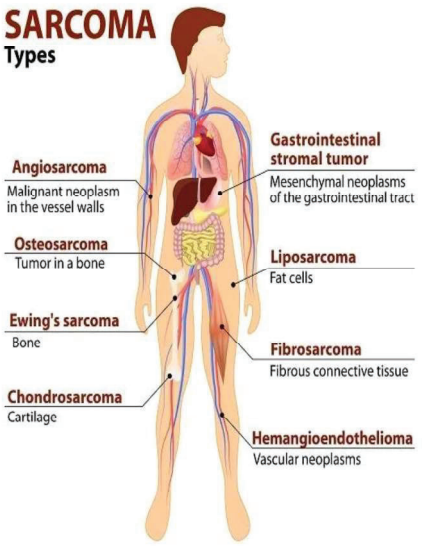
Objectives

- Enhance clinical knowledge
- Proactively identify needs
- Understanding disease trajectory
- Improve patient care and support
- Provide education to patients and families

2

2 (Broad) Categories

- Sarcomas of Bone
- Sarcomas of Soft Tissue
  - Fat
  - Muscle
  - Nerve and Nerve Sheath
  - Blood Vessels
  - Other Connective Tissue

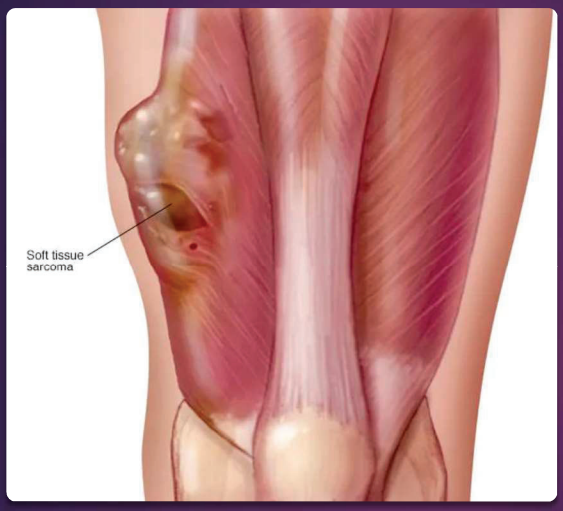


3

Sarcoma Overview

- A heterogeneous group of rare solid tumors of mesenchymal cell origin with distinct clinical and pathological features.
- Soft Tissue Sarcoma (STS): 2022 estimated diagnosed: 13,190; approximate deaths: 5,130
  - Accounts for only 1% of all adult malignancies
- Bone sarcoma: 2025 estimated diagnosed: 3,770; 2025 estimated deaths: 2,190
  - Very rare, accounting for <0.2% of all cancers.

4



Soft Tissue Sarcoma (STS)

5

Epidemiology

- Race
  - No affinity
- Gender
  - Slight male predominance
- Age
  - Incidence rise with age: >60 y.o: >51.7 %

6

Etiology

Usually, no definitive cause

Several factors associated with different subtypes

- Prior radiation treatment to affected area
- Chemical
  - Herbicides (ex: agent orange)
- Genetic
  - Li-Fraumeni syndrome, neurofibromatosis, retinoblastoma, familial adenomatous polyposis (FAP), Gardner's syndrome, Carney-Stratakis syndrome
- Chronic lymphedema
- Viruses
  - HHV8, Epstein Barr virus (EBV)

7

STS Presentation

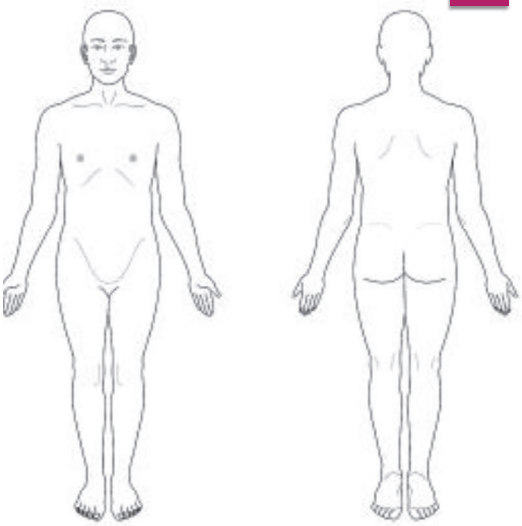
Lump or swelling under the skin

- Painless (most common)
- Painful
- Hard
- Location dependent

8

Most Common Primary Sites:

- Extremities 43%
- Visceral 19%
- Abdominal/ Retroperitoneal 15%
- Trunk 10%
- Head and Neck 9%
- Other 4%



9

Diagnosis

Biopsy

Core Needle (Preferred)

Incisional

Imaging

X-Ray

CT TAP

MRI

PET/CT

10

Soft Tissue Sarcoma (STS)

>50 different histologic subtypes

Uncommon subtypes:

- Synovial sarcoma
- Angiosarcoma

Common subtypes include:

- Undifferentiated pleomorphic sarcoma (UPS) (14%)
- GIST (Gastrointestinal stromal tumor) (9%)
- Liposarcoma (20%)
- Leiomyosarcoma (14%)
- Synovial sarcoma (5%)
- Myxofibrosarcoma (5%)
- Other (33%)
- Rhabdomyosarcoma (most common in children + adolescents, less common in adults)

11

Treatments

- Chemotherapy
- Surgery
- Radiation
- Targeted Agents
- Immunotherapy

12

Prognosis

- Associated with primary location
- Staging
- Size
- Depth
- Histologic grade
- Treatment- induced tumor necrosis
  - ≥90% Improved survival
- 5 year survival
  - Localized Disease 81%, Metastatic Disease 16%
  - Stage I (90%)
  - Stage II (81%)
  - Stage III (56%)

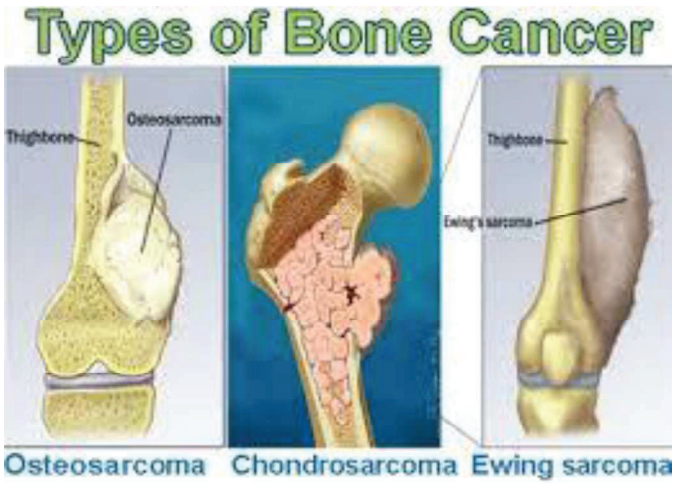
Larger size (>5cm), greater depth, higher grade and stage = worse prognosis

13

Metastasis

- Lungs
  - Most common site
- Can vary based on primary lesion / histology
  - Abdominal cavity tumors commonly metastasize to the liver and peritoneum
- Lymph node involvement rare (<5%)
  - Exception: rhabdomyosarcoma, epithelioid, clear cell, angiosarcoma

14



Bone Sarcoma

15

Epidemiology

- Race
  - Osteosarcoma - slightly more common in African American, Hispanics, and Latino children than in White children
- Gender
  - Chordoma - more common in males
- Age
  - Chondrosarcoma – middle-aged and older adults
    - Risk increases with age
  - Chordoma – older adults
  - Undifferentiated pleomorphic sarcoma (UPS)/fibrosarcoma - adults
  - Ewing sarcoma –children & young adults
  - Osteosarcoma – children & young adults

16

Etiology

- Multiple risk factors associated with different subtypes:
  - Genetic
    - Germline Mutations examples: Li-Fraumeni syndrome (TP53) associated with high risk of developing osteosarcoma. Heredity retinoblastoma (RB1) – osteosarcoma most common secondary primary malignancy
  - Prior radiation therapy
    - Osteosarcoma - most common radiation-induced bone sarcoma
  - Transformation of paget disease and other benign bone lesion diseases
  - Prior chemotherapy

17

Bone Sarcoma

- Bone sarcoma sub-types:
  - Chondrosarcoma (40%)
    - Pelvis and proximal femur most common primary origin sites
  - Osteosarcoma (28%)
  - Chordoma (10%)
  - Ewing sarcoma (8%)
    - Can also occur in soft tissue
  - Undifferentiated pleomorphic sarcoma (UPS)/fibrosarcoma (4%)
  - Other (10%)

18

Histologic Origin

- Chondrosarcoma = cartilage
- Osteosarcoma = bone
- Chordoma = embryonic remnants of the notochord tissue
- Fibrosarcoma = fibrogenic tissue
- Hemangioendothelioma & hemangiopericytoma = vascular tissue
- Ewing sarcoma & many primary bone cancer = unknown
  - Ewing sarcoma - characterized by the fusion of the EWS gene (EWSR1) on chromosome 22q12 with various members of the ETS gene family

19

Bone Sarcoma Presentation

- Chondrosarcoma
  - Local pain and swelling (most common), weakness, bowel/bladder control issues (spinal cord)
- Chordoma
  - Pain, weakness, numbness in back, arm, and/or legs
  - Double vision, blurry vision, headaches, facial numbness and pain (base of skull)
- Ewing sarcoma
  - Pain and/or swelling, fever, weight loss, fatigue
- Osteosarcoma
  - Pain and/or swelling at primary tumor site

20

Diagnosis

- Imaging
  - CT TAP
  - Bone scan
  - PET/CT
  - *Other scans / tests as clinically indicated
- Biopsy
  - Incisional/open
    - More accurate
  - Core Needle
    - Accuracy between 88-96%
  - Fine-needle aspiration (FNA)*
    - Not suitable for diagnosis of primary lesion due to diagnostic accuracy

21

Treatments

- Chemotherapy
- Surgery – Limb sparing vs Amputation
- Radiation
- Targeted Agents
- Immunotherapy
- Radiopharmaceutical

22

Prognosis Factors

- **Chondrosarcoma**
  - Staging
  - Primary or secondary
  - Central or peripheral
  - Anatomic location
    - axial versus cranial or appendicular tumor locations =poorer OS
  - Gender
    - Females with low grade and local surgical stage associated with significant disease-free survival benefit
  - Histologic grade
  - Size
  - Surgical margins

23

Bone Sarcoma Prognosis Factors

Osteosarcoma (extremities and trunk)

- Staging
- Tumor site
  - distal location other than proximal humerus/femur = improved survival
- Tumor size
- ALP and LDH levels
- Age
- BMI
  - High = lower OS
- Metastases (presence and location)
- Type of surgery and surgical margins
- Treatment-induced tumor necrosis
  - ≥90% necrosis
- Gender
  - Female (improved survival)
- Time to first relapse
  - Localized 30% ; metastatic 80%

Chordoma

- Staging
- Histologic grade
- Gender
  - Male sex was associated with worse PFS and OS in a review of 47 patients with skull base chordomas
- Location
- Surgical margins

24

Prognosis Factors

- Ewing sarcoma
  - Staging
  - Distal / peripheral site of primary tumor location
  - -Anatomic location
    - spine and sacrum is associated with significantly worse outcome and prognosis than other sites
    - Pelvic bone have lower survival rates compared with patients with lesions in distal bones of the extremities
  - Age
  - Race
    - Hispanic
  - Socioeconomic status
  - Size
    - Diameter >8 cm
  - Tumor volume
    - <100 mL = better prognosis
  - LDH level
    - WNL = better prognosis
  - Metastatic disease
    - *Most significant adverse prognostic factor
  - Histologic/radiographic response
    - Tumor necrosis ≥90% = better prognosis
    - Poor response to chemotherapy = an adverse prognostic factor in patients with localized non-metastatic disease, even when chemotherapy was followed by R0 resection
  - Time to first relapse
    - About 30 - 40% experience recurrence (local and/or distant) and have a very poor prognosis.
    - Longer time to first recurrence (≥2) = a better chance of survival following recurrence.

25

Prognosis - 5 Year Relative Survival Rates

- Ewing sarcoma
  - Localized 82%, Regional 70%, Distant 39%
- Osteosarcoma
  - Localized 77%, Regional 65%, Distant 26%
- Chordoma
  - Localized 87%, Regional 84%, Distant 69%
- Chondrosarcoma
  - Localized 91%, Regional 76%, Distant 17%

*Across all types of primary bone sarcoma 66.8%

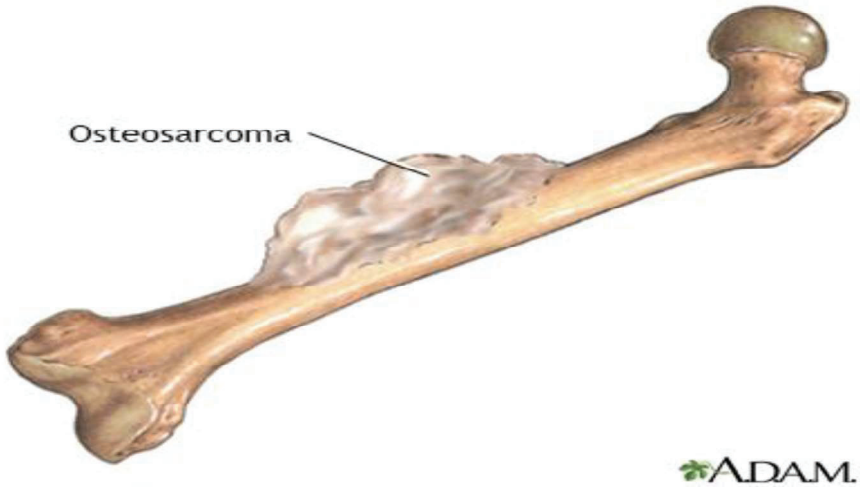
26

Metastasis

- Ewing sarcoma
  - Most common sites: lungs, bone, bone marrow
    - Better survival for those with lung metastases compared to those with bone metastases or a combination of lung and bone metastases
  - Uncommon sites = worse prognosis
- Osteosarcoma
  - 10% – 20% present at diagnosis
  - LDH higher in patients with metastatic disease upon presentation compared to patients with localized disease.
  - DFS significantly higher with one or two metastatic lesions compared to 3 or more (78% and 28%)

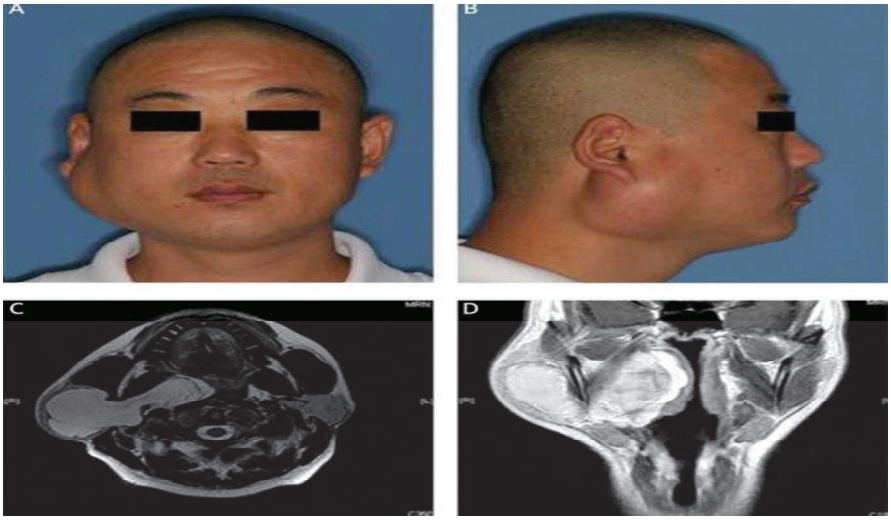
27

Osteosarcoma



28

Liposarcoma



29

Recovery (Soft Tissue and Bone Sarcoma)

- Dependent on type, stage, location, treatment
- Can include:
  - Imaging
  - Assessments
    - Symptom management
      - Pain
    - Mobility
    - Nutrition
    - Psychosocial
    - Skin

30

Sarcoma Patient Education (STS and Bone)

- Effects of treatments
- Symptom management
- Appropriate services
  - Fertility preservation
  - Rehab services
  - Nutritional support
  - Psychological support
  - Wound care
  - Genetic testing
- Long term follow-up

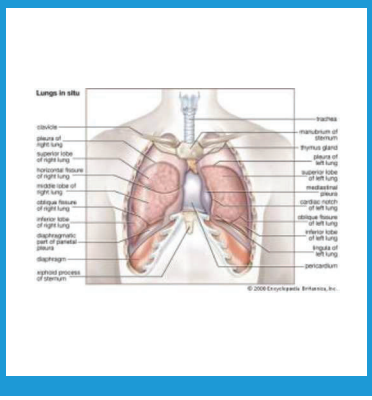
Before, During, After

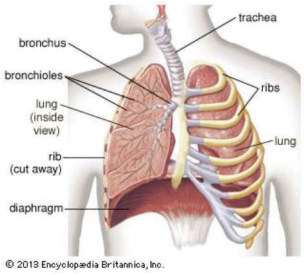
31

Sarcoma Key Points

- Sarcoma consist of 2 broad categories (soft tissue and bone) with multiple histological subtypes
- Soft tissue – no definitive cause but several factors associated with different subtypes / Bone - multiple risk factors associated with different subtypes (prior radiation, genetics,…)
- Size, location, metastases are just a few factors that play a role in prognosis for soft tissue and bone.
- Treatment options include surgery, chemotherapy, targeted therapy, immunotherapy, radiation, radiopharmaceutical (bone)
- Recovery includes imaging, pain management, PT/OT, wound care

32





LUNG CANCER

Mary E. Kern, MSN, RN, OCN, CHSE
AHNCI Professional Development Specialist
Mary.KERN@ahn.org
No Disclosures

1

OUTCOMES

- Recognize lung anatomy
- Identify risk factors for lung cancer
- Provide examples of clinical manifestations in lung cancer
- Summarize screening tools as they relate to lung cancer
- Contrast non-small cell lung cancer and small cell lung cancer
- Relate staging to prognosis
- Discuss treatment modalities for lung cancers

2

ANATOMY

Lungs:

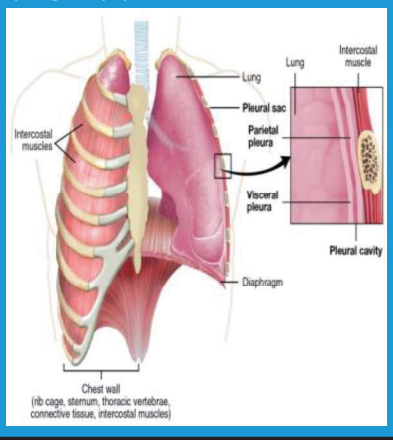
-Spongy, Air filled, two

-Lobes- left (2) right (3)

Trachea

Bronchi

Alveoli



Pleura-Encloses lung

-Two layers **Visceral, Parietal**

Pleural Cavity-space between layers

Pleural fluid-created by mesothelial cells of pleural membrane- lubricates and keeps lung next to thoracic wall

3

THE PATIENT

- 62 years old
- Smokes- 2 packs per day since age of 18
- Has been an oncology nurse mixing and administering chemotherapy for over 20 years.
- At PCP for wellness check which includes CBC, CMP, lipids and CXR
- Has no complaints
- verbalizes health is “good” and is in usual state of health

4

THE PATIENT (CON'T). ASSESSMENT

- VS WNL
- General: A &O x3 no acute distress
- HEENT: Extraocular movements intact, mucous membranes moist and intact, no sores
- Lymph nodes: no palpable lymphadenopathy
- Abdomen: + BS, non tender non distended
- Extremities: No edema or rashes noted.
- Heart: RRR
- Lungs: https://youtube.com/clip/UgkxxOKdHMpFW2IfUY0M13oNg32fnARPuW_V

5

CONCERNS?

6

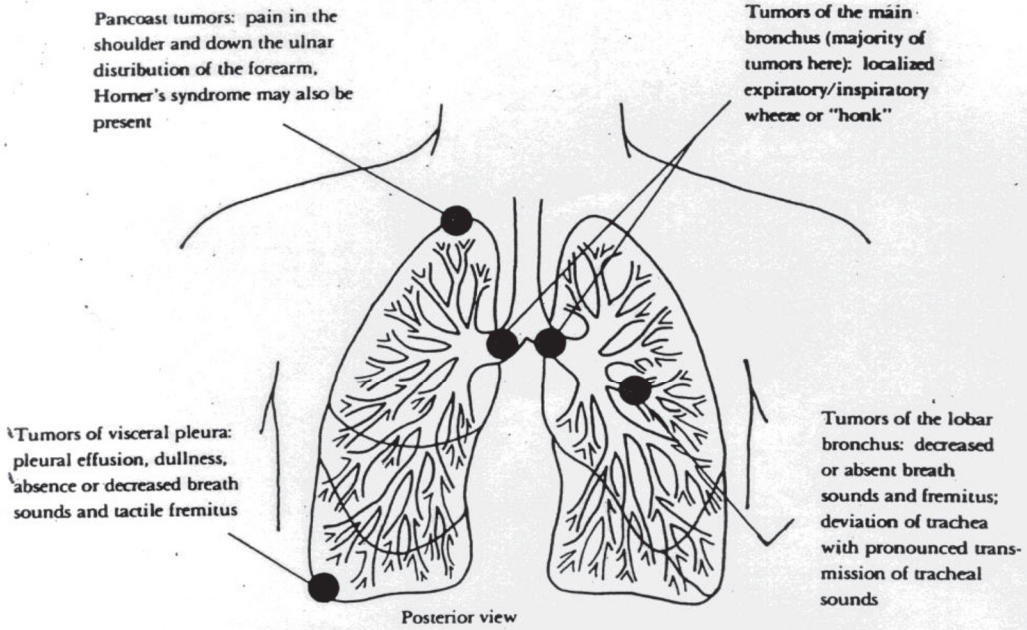


Figure 24–1. Anatomic relationships and tumor locations in the lung. (From Frank-Stromborg, M., & Cohen, R. [1990]. Assessment and interventions for cancer prevention and detection. In S. Groenwald, M.H. Frogge, M. Goodman, & C.H. Yarbro [eds.]. *Cancer Nursing Principles and Practice.* Boston: Jones & Bartlett, p. 128.)

7

Risk factors

- Smoking
- Exposure to secondhand smoke
- Exposure to Radon gas
- Workplace exposure
  - Asbestos
  - Arsenic
  - Chemotherapy
  - Chromium
  - Nickel
- Family history of lung cancer

Prevention

- Don't smoke/Stop smoking
- Avoid secondhand smoke
- Test for Radon
- Avoid work exposure:
  - Use PPE offered
- Eat fruits and vegetables
- Exercise most days

8

KNOWLEDGE CHECK

- Which factor is the most significant risk factor for lung cancer?
- A. Family history
- B. Occupational exposure
- C. Cigarette smoking
- D. Prior pneumonia

9

CLINICAL MANIFESTATIONS

Local/Regional symptoms

*** Cough**
*** Hemoptysis**
*** Dyspnea**
***Chest Pain**
Wheezing
*** Hoarseness**
Pneumonia
Bronchitis
Pleural effusions
Pancoast syndrome
Superior Vena cava syndrome

***May present as asymptomatic and be found during routine testing or testing for other complaints.**

10

CLINICAL MANIFESTATIONS

Extrathoracic

*** Headache**

CNS disturbances

*** Bone pain**

Hepatomegaly

GI Issues

Systemic

Weakness

Anorexia

*** Unintentional weight loss**

Fatigue

Cachexia

Paraneoplastic syndrome

11

SCREENING, EARLY DETECTION, AND DIAGNOSIS

- CT Screening scan-
  - low dose CT scan
  - 50 to 80 years old
  - smoking history 20 pack years
  - currently smoke/quit within last 15 years

- Assessment
- Imaging-X-ray/CT
- Sputum cytology
- Tissue sampling-biopsy
  - Bronchoscopy
  - Mediastinoscopy

12

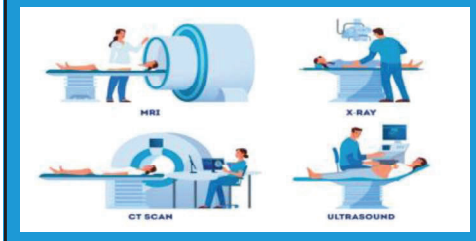
KNOWLEDGE CHECK

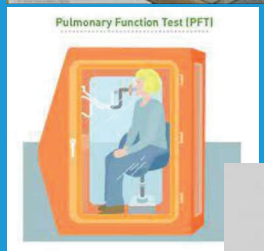
- Which patient meets current USPSTF criteria for lung cancer screening?
- A. 48-year-old nonsmoker
- B. 70-year-old with 25 pack-years who quit 10 years ago
- C. 55-year-old with 15 pack-years
- D. 82-year-old current smoker

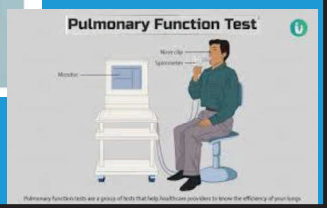
13

DIAGNOSTICS

- CT
- MRI
- **P**ositron **E**mission **T**omography
- Bone scan
- **P**ulmonary **F**unction **T**ests







14

STAGING

Staging- extent of disease

T/M	Subcategory	N0	N1	N2	N3
T1	T1a	IA1	IIB	IIIA	IIIB
	T1b	IA2	IIB	IIIA	IIIB
	T1c	IA3	IIB	IIIA	IIIB
T2	T2a	IB	IIB	IIIA	IIIB
	T2b	IIA	IIB	IIIA	IIIB
T3	T3	IIB	IIIA	IIIB	IIIC
T4	T4	IIIA	IIIA	IIIB	IIIC
M1	M1a	IVA	IVA	IVA	IVA
	M1b	IVA	IVA	IVA	IVA
	M1c	IVB	IVB	IVB	IVB

15

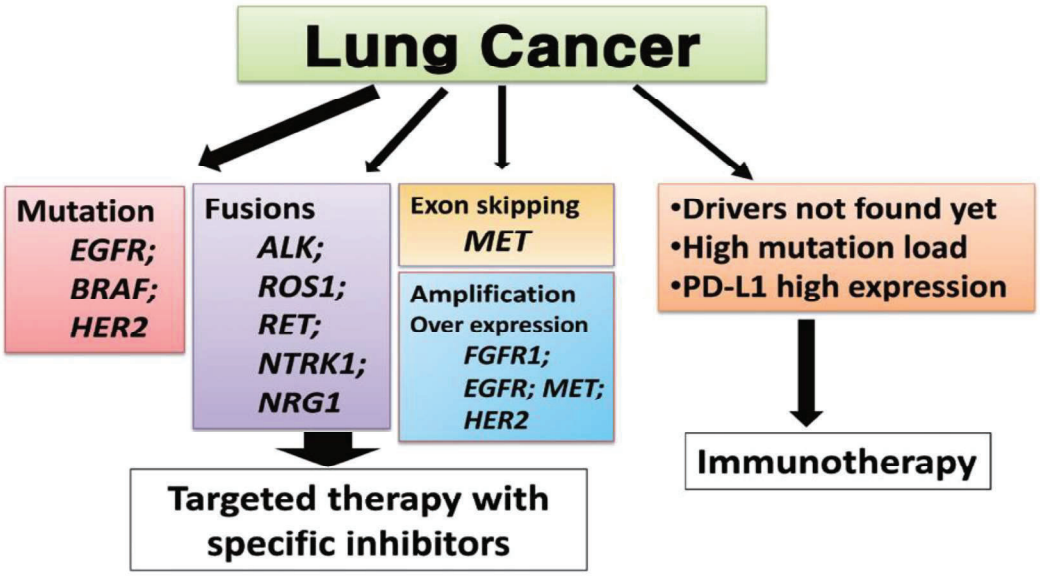
Definitions for TNM descriptors

	T (primary tumor)
T0	No primary tumor
Tis	Carcinoma in situ (squamous or adenocarcinoma)
T1	Tumor ≤ 3 cm
T1mi	Minimally invasive adenocarcinoma
T1a	Superficial spreading tumor in central airways*
T1a	Tumor ≤1 cm
T1b	Tumor >1 but ≤2 cm
T1c	Tumor >2 but ≤3 cm
T2	Tumor >3 but ≤5 cm or tumor involving visceral pleura main bronchus (not carina), atelectasis to hilum
T2a	Tumor >3 but ≤4 cm
T2b	Tumor >4 but ≤5 cm
T3	Tumor >5 but ≤7 cm or invading chest wall, pericardium, phrenic nerve; or separate tumor nodule(s) in the same lobe
T4	Tumor>7 cm or tumor invading: mediastinum, diaphragm, heart, great vessels, recurrent laryngeal nerve, carina, trachea, esophagus, spine; or tumor nodule(s) in a different ipsilateral lobe
	N (regional lymph nodes)
N0	No regional node metastasis
N1	Metastasis in ipsilateral pulmonary or hilar nodes
N2	Metastasis in ipsilateral mediastinal or subcarinal nodes
N3	Metastasis in contralateral mediastinal, hilar, or supraclavicular nodes
	M (distant metastasis)
M0	No distant metastasis
M1a	Malignant pleural or pericardial effusions or pleural or pericardial nodules or separate tumor nodule(s) in a contralateral lobe
M1b	Single extrathoracic metastasis
M1c	Multiple extrathoracic metastases (1 or >1 organ)

Detterbeck, 2017

16

A QUICK WORD ON GENES



17

TYPES: NON-SMALL CELL

Adenocarcinoma

Most common type

Most common:

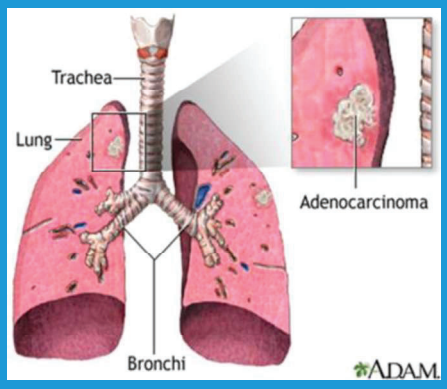
Nonsmokers

Women

Younger people

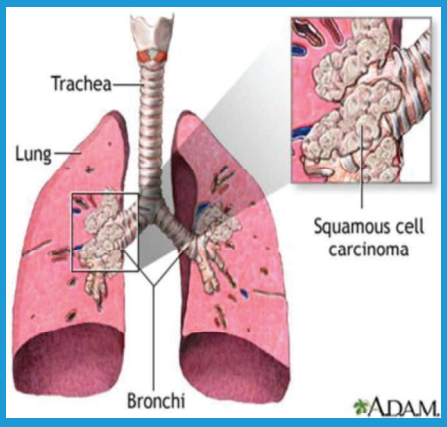
Occurs at the outer edges of the lungs

Accounts for 40% of all non-small cell lung cancers



18

TYPES: NON-SMALL CELL



Squamous cell

Slow growing-from in situ to invasive 3-4 years

Occurs more in smokers

Occurs in central areas of lung (proximal bronchi)

25-30% of NSCLC

19

TYPES: NON-SMALL CELL

Large cell

Rare

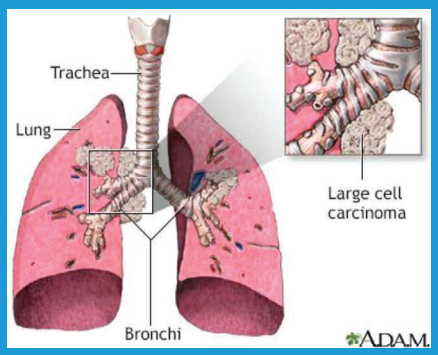
Undifferentiated cell type

Aggressive

Dx of exclusion

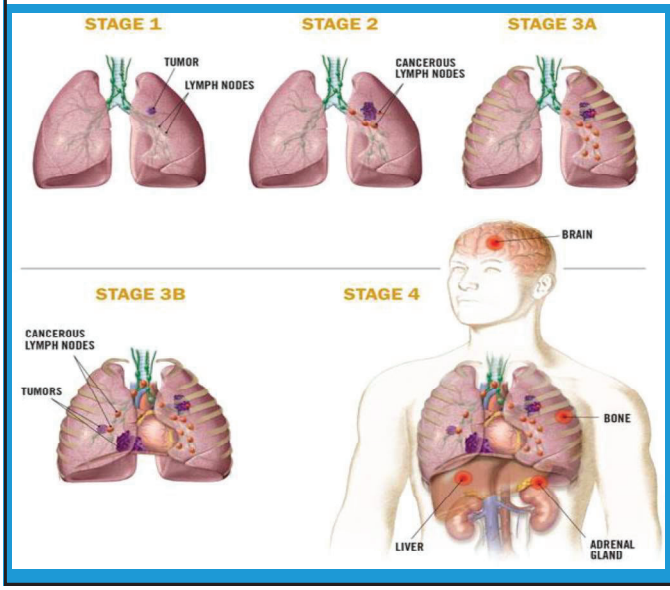
Can occur anywhere in the lung

10-15% of all diagnoses



20

STAGING



Stage II (LN involvement

Stage IIIA (local LN and structure)

Stage IIIB

Stage IV

All further subdivided

21

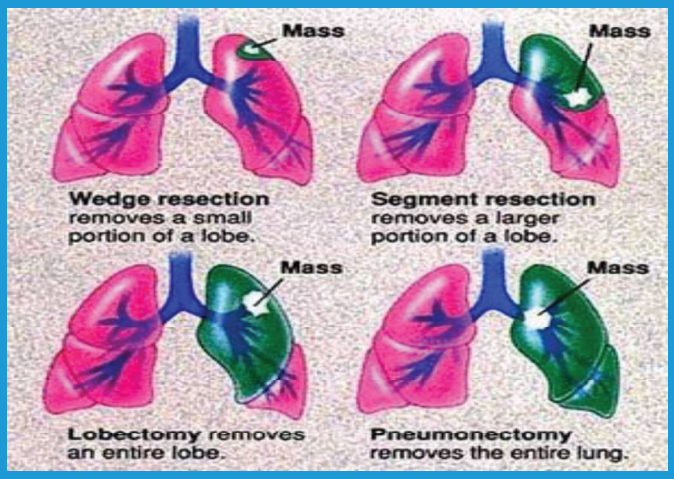
PROGNOSIS

NSCLC Staging	Diagnosis frequency	5- year survival rate
I	10%	> 60%
II	20%	30-50%
IIIA	15%	15-30%
IIIB	15%	3-6%
IV Metastatic	40%	<1%

22

TREATMENT

- Surgery- Stage I, II, IIIA
- Radiation
- Chemotherapy
- Targeted therapy
- Immunotherapy



23

TARGETABLE GENETIC ALTERATIONS

Gene	Representative subtypes or variants	Frequency	Targeted agents
Mutations			
EGFR	Exon 19 deletion, Exon 21 L858R, Exon 20 T790M	40%–50% in ADCs[a] 10%–20% in ADCs[b]	Gefitinib, erlotinib, afatinib, osimertinib
KRAS	G12X, G13X, G61X	5%–10% in ADCs[a] 20%–30% in ADCs[b]	MEK inhibitors
BRAF	V600E	1%–4% in ADCs	Vemurafenib, dabrafenib,
HER2	p.A775 G776insYVMA in exon 20	1%–2% in ADCs	Trastuzumab, afatinib
MET	Splice site mutations around or in exon 14	3%–4% in ADCs	Crizotinib, cabozantinib
Gene fusions			
ALK	*EML4-ALK, TGF-ALK, KIF5B-ALK*	5% in ADCs	Crizotinib, ceritinib, alectinib
ROS1	*CD74-ROS1, EZR-ROS1, SLC34A2-ROS1, SDC4-ROS1*	1% in ADCs	Crizotinib, ceritinib
RET	*KIF5B-RET, CCDC6-RET*	1% in ADCs	Cabozantinib, vandetanib, alectinib
NTRK1	*MPRIP-NTRK1* and *CD74-NTRK1, TPM3-NTRK1*	< 1% in ADCs	Entrectinib
FGFR1/3	*FGFR3-TACC3, BAG4-FGFR1*	1% in NSCLCs	FGFR inhibitor
NRG1	*CD74-NRG1, SLC3A2-NRG1, VAMP2-NRG1*	7% in mucinous ADCs	NA
Amplifications			
FGFR1	Gene amplification	13%–22% in SQCs	FGFR inhibitor
EGFR	Gene amplification	8%–9% in SQCs,	EGFR inhibitor
MET	Gene amplification	2%–4% in ADCs	Crizotinib
HER2	Gene amplification	1%–2% in ADCs	Trastuzumab, afatinib

ADC, adenocarcinoma; NSCLC, non-small cell lung carcinoma; FGFR, fibroblast growth factor receptor; NA, not available; SQC, squamous cell carcinoma; EGFR, epidermal growth factor receptor.
[a]Asian populations; [b]Western populations.

PD-L1- Protein
can indicate if the cancer is more likely to respond to treatment with certain immunotherapy drugs

(Shim et al., 2017)

24

KNOWLEDGE CHECK

- What is the primary purpose of molecular testing in NSCLC?
- A. Determine surgical eligibility
- B. Predict radiation response
- C. Guide targeted and immunotherapy selection
- D. Replace staging

25

TYPES- SMALL CELL

Neuroendocrine origin

Epithelial tumor

Large central airways

98% Associated with smokers

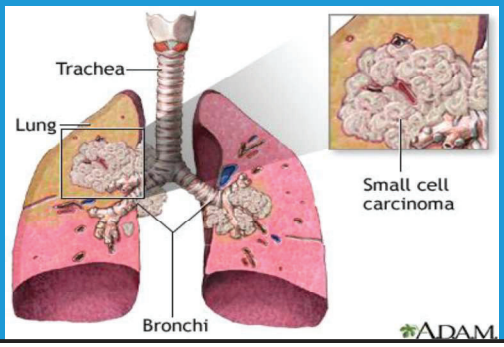
Start treatment quickly

Fast growing

Highly sensitive to initial Anticancer therapies

Metastasizes early

Start treatment quickly



26

STAGING

TNM not used prior to 2011 for SCLC

Key factor: Ability to encompass all the disease within **1** tolerably safe radiation field

TNM	VA Stage (VALSG)	Incidence
T1-2, No, Mo Stage I	Limited Stage	5%
T any, N any, Mo Stage I-III	Limited Stage; Disease burden within radiation field	30 %
T any, N any, M1 Stage IV	Extensive stage; Disease burden extends beyond radiation field	65%

27

PROGNOSIS

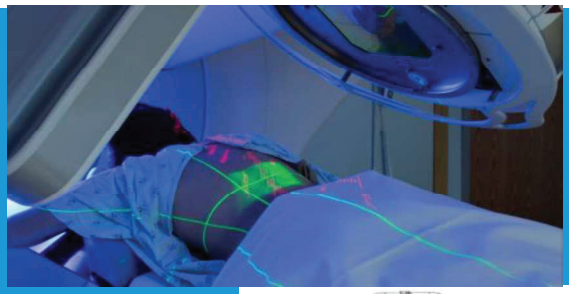
SCLC Staging	5-Year Survival Rate
I	31%
II	19%
III	8%
IV	2%

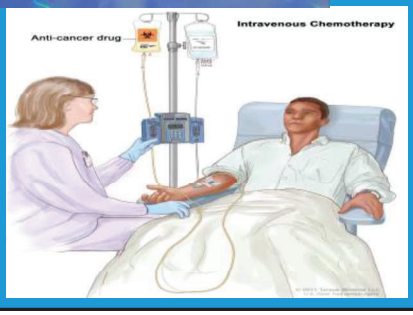
28

TREATMENT

- Surgery- Stage I, IIA
- Radiation
- Chemotherapy
- Immunotherapy
- Laser Therapy

*Very sensitive to radiation and chemotherapy





29

GENETIC ALTERATIONS IN SMALL CELL LUNG CANCER

Gene (locus)	Alteration	Possible drug/therapeutic targeting abnormalities
FHIT (3p14.2)	Loss (80% of SCLC)	
RASSF1 (3p21.3)	Loss (>90% of SCLC)	
RARB (3p24)	Loss (72% of SCLC)	
TP53 (17p13.1)	Mutation and deletion (>75% of SCLC)	p53 adenoviral vector (Advexin)
c-Kit	Overexpressed	Tyrosine kinase inhibitor (imatinib)
Src	Constitutively activated	Src inhibitor (dasatinib)
c-Met	Amplified, overexpressed or mutated	siRNA, c-Met inhibitor SU11274
RB1	Altered (>90% of SCLC)	
PI3K/Akt/mTOR	Constitutively activated	PI3K inhibitor (LY294002) mTOR inhibitor (rapamycin) and its derivatives (CCI-779, RAD001, AP23576)
Bcl-2	Overexpressed	Antisense oligonucleotide (oblimersen sodium) Inhibitor of Bcl-2 (ABT-737)
VEGF	Overexpressed	Humanised monoclonal antibody (bevacizumab) VEGFR-2 and EGFR inhibitor (ZD6474)

(Huber & Tufman ,2012)

30

KNOWLEDGE CHECK

- What distinguishes small cell lung cancer from non–small cell lung cancer?
- A. Peripheral tumor location
- B. Early metastasis
- C. Slow Progression
- D. Primary surgical treatment

31

SUMMARY OF KEY POINTS

- Lung cancer may not have presenting symptoms
- Clinical manifestation include local, regional and systemic symptoms
- Staging- extent of disease
- Non small cell- Adenocarcinoma, Squamous cell, Large Cell
- Small cell- Fast growing, * Start treatment quickly*
- Genetic markers useful to guide treatment

32

33

BREATH SOUNDS

- https://youtu.be/KRtAqeEGq2Q?t=16

- Dr. Prodigious on YouTube
- https://youtube.com/playlist?list=PLwlvPe1bGTl8FKjK4iXtAoCiW3siNu-oP

34

References

A.D.A.M. Images. (2021). http://www.adamimages.com/Home

American Joint Committee on Cancer. (2018). AJCC Cancer Staging Manual. (8th ed.). http://sxc.cancerstaging.org/references-tools/quickreferences/Documents/Lung%20Cancer%20Staging%20Poster%20Updated.pdf

American Lung Association Ad Council. (2018, October 2). *Lung cancer screening* [Video]. YouTube. https://youtu.be/4_EHPTKuoL4

Detterbeck, F. (2017) . The eighth edition TNM stage classification for lung cancer: What does it mean on main street? *The Journal of Thoracic and Cardiovascular Surgery, 155,356-359.* https://doi.org/10.1016/j.jtcvs.2017.08.138

35

Dr. Prodigious. (2018, September 11). Heart and lung sounds collection [Video]. YouTube. https://youtube.com/playlist?list=PLwlvPe1bGTl8FKjK4iXtA0CiW3siNu-0P

EMTPREP. (2019, December 27). *Lung sounds collection* [Video]. YouTube https://youtu.be/KRtAqeEGq2Q?t=15

Huber, R.M., & Tufman, A. (2012). Update on small cell lung cancer management. *Breathe, 8*(4) 315-330. https://DOI:10.1183/20734735.013211

National Cancer Institute. (2021). Lung Cancer. https://www.cancer.gov/types/lung/hp

Shim, H.Y., Choi, Y.L., Kim, L., Change, S., Kim, W.S., Roh, M.S., Kim, T.J., Ha, S.Y., Jang, S.J., & Lee, G.K. (2017). Molecular testing of lung cancers. *Journal of Pathology and Translational Medicine, 51*(3), 242-454. https://doi.org/10.4132/jptm.2017.04.10

36

US Preventive Services taskforce. (2021). Lung Cancer Screening. https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/lung-cancer-screening

Visuals online-National Cancer Institute. (2021). https://visualsonline.cancer.gov/searchaction.cfm?q=&topicid=g3&sort=dateadded&page=1

Yarbro C., Wujcik D., & Holmes B. (Eds.). (2018). *Cancer Nursing: Principles and Practice (8th ed.)*. Jones & Bartlett Learning.

Genitourinary Cancers: Prostate, Testicular, Kidney, and Bladder Cancer

Mary E. Kern, MSN, RN, OCN, CHSE
AHNCI Professional Development Specialist
Mary.KERN@ahn.org
No Disclosures

1

Outcomes

- Review the anatomy of prostate, testicular, kidney, and bladder cancer
- Discuss symptoms of prostate, testicular, kidney and bladder cancer
- Identify risk factors of genitourinary cancers
- Describe the various treatment modalities for these cancers

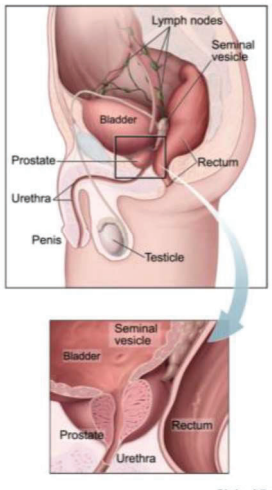
2

PROSTATE CANCER

3

gure 1

ostate and Nearby Organs

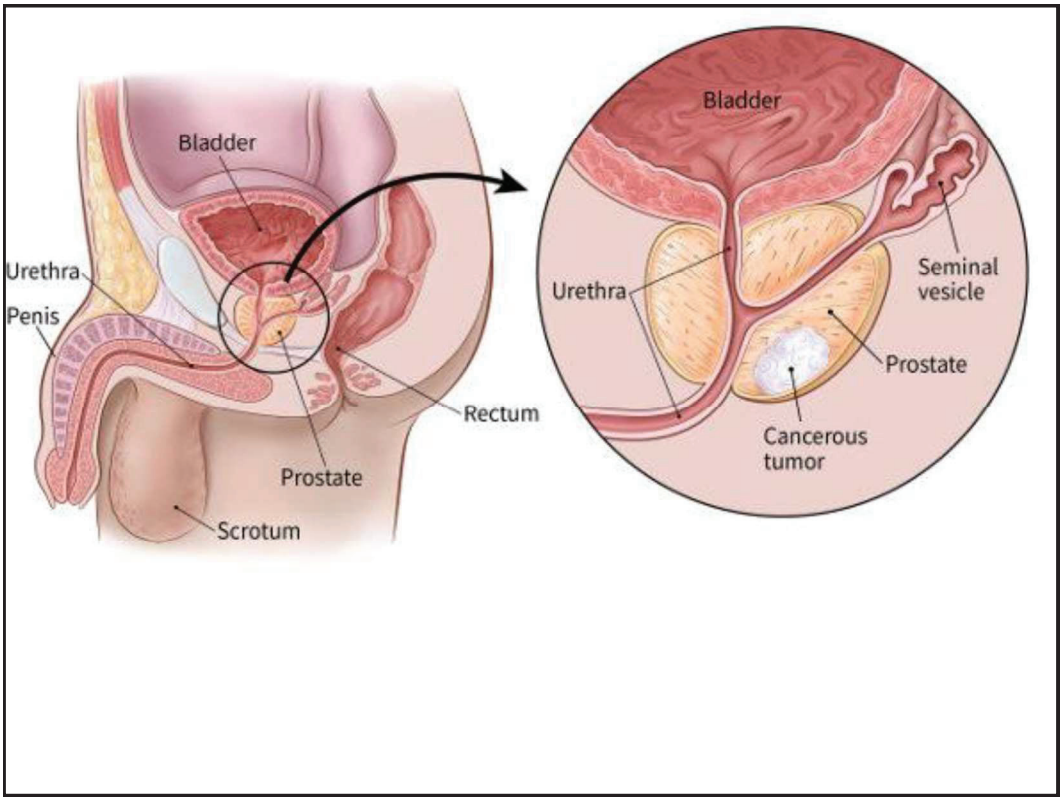


(National Cancer Institute [NCI], 2005)

Anatomy

- Part of the male reproductive system
- Roughly the size of a walnut
- Made up of muscular and glandular tissues
- Primary purpose is to produce and secrete alkaline fluid to transport sperm

4



5

Prostate and skin cancer are the most common cancers in men in the United States.

One in 8 men will be diagnosed with prostate cancer in their lifetime.

Risk factors:

- **Age:** More common in men over the age of 65
- **Race:** African American men are at a higher risk
- **Geography:** More prevalent in North America, northwestern Europe, Australia, and the Caribbean
- **Genetic factors:** Mutations such as BRCA1, BRCA2, and Lynch syndromes increases risk
- **Family history:** Patients with a father, brother, or son diagnosed <65 years old are at higher risk

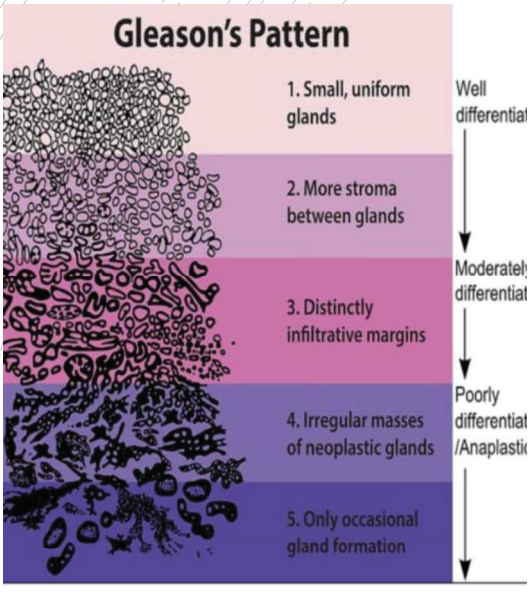
6

Screening recommendations

- **Age 50** for males with **average risk** with a life expectancy of 10 years or more
- **Age 45** for men at **higher risk**
- **Age 40** for men with the **highest risk** factors
- **Prostate-specific antigen (PSA)** blood test is the **recommended** method of screening
- Digital rectal exams may or may not be used for screening
- Per The American Urology Association, **digital rectal exams** should only be used if there is an **elevated PSA level**.
- Screening decisions based on life expectancy (>10 years)

7

Staging



*Gleason scores: 1-5 for cell differentiation from 2 sites.

Clinical Manifestations

Early stages of prostate cancer can cause no symptoms

As disease progresses

- Dysuria
- Hematuria
- Sexual dysfunction

Advanced stages

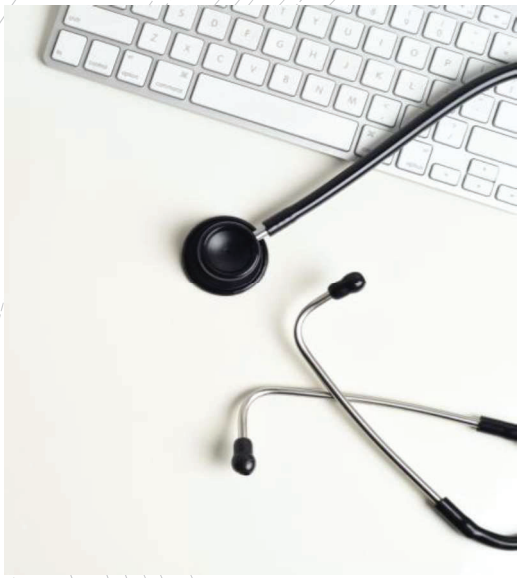
- bone pain
- flank pain
- anemia
- fatigue
- weakness
- weight loss

8

Treatment Modalities

- **Localized disease**: Active surveillance, surgery, or radiation
- **Advanced disease**: Androgen deprivation therapy + novel antiandrogens
- Targeted therapy: PARP inhibitors for BRCA-mutated disease
- Immunotherapy: Limited role, select metastatic cases
- Bone-protective agents essential with metastatic disease

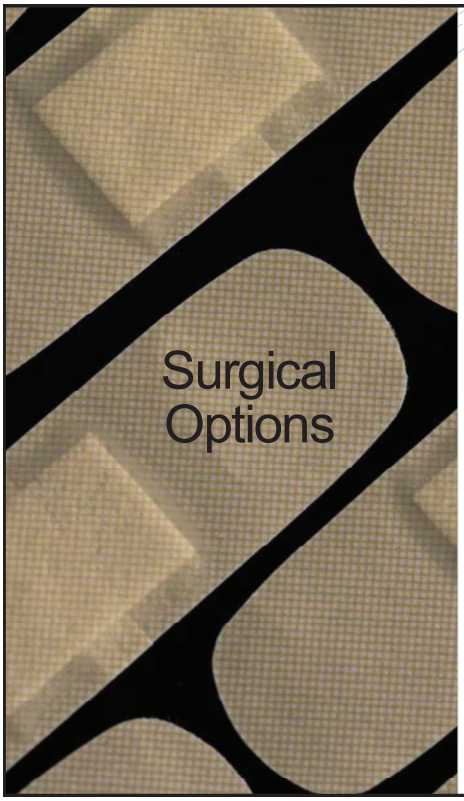
9



Active Surveillance

- Watchful waiting
- Used with slow-growing asymptomatic disease
- Used when treatment side-effects could do more harm than good or if the patient has other disease
- Every 6-month exam and PSA

10



Radical retropubic prostatectomy- incision to the lower abdomen, prostate and pelvic lymph nodes may be removed.

Laparoscopic radical prostatectomy- several small incisions to the abdomen where the prostate and surrounding tissues are removed.

Transurethral resection of the prostate (TURP)-removal of the inner portion of the prostate gland

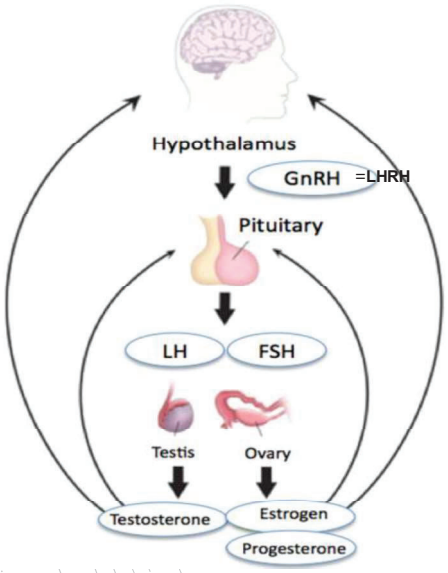
Orchiectomy– surgical removal of testicles with the purpose of reducing hormone levels

Surgical side effects:

- Bleeding
- Reactions to anesthesia
- Infection
- Blood clots
- Lymphedema (where applicable)
- Incontinence

11

Hormonal Therapy



The testes produce the most testosterone

- LHRH(GnRH) is released from the hypothalamus.
- LHRH goes to the pituitary, which releases LH
- The testes are stimulated to produce testosterone (an androgen)

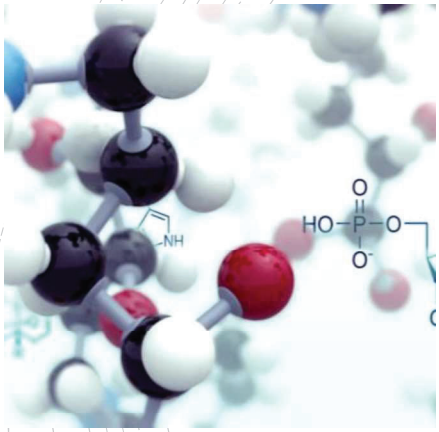
Three types of cells in prostate tissue-normal or malignant:

- androgen-dependent,
- androgen-sensitive, and
- androgen-independent

*Adrenal glands produce hormones that account for about 40% of intraprostatic testosterone

12

Hormonal Therapy



Androgen Deprivation Therapy

The goal is to reduce circulating androgen levels to castrate levels by eliminating the androgen

Effects:

- Androgen-dependent cells die off
- Androgen-sensitive cells to stop dividing
- Androgen-independent cells will continue to grow

13

Hormonal Therapies

Luteinizing Hormone-releasing Hormone (LHRH) agonists (Leuprolide, Goserelin)	Lower androgen levels.	Can initially increase testosterone levels (flare)	Patients with bone mets may have increased bone pain during the flare
Anti-androgens/androgen receptor antagonist (Flutamide, bicalutamide)	Prevents binding of testosterone on prostate cells	can be given before the LHRH agonist	LFT monitoring
Luteinizing Hormone-releasing Hormone (LHRH) antagonist (Degarelix)	Block LH and FSH	Lower testosterone quickly	Do not cause a flare.

14

Side Effects

Orchiectomy, LHRH antagonist, and agonist have similar side effect profiles:

- Hot flashes
- Erectile dysfunction
- Anemia
- Osteoporosis
- Decreased sex drive
- Breast enlargement, and tenderness
- Weight gain
- Fatigue
- Depression
- Increased cholesterol levels

15

Radiation

External beam radiation

- Three-dimensional
- Conformational stereotactic
- Proton beam radiation

Brachytherapy (Internal radiation)

- Permanent
- Temporary

Side effects

- include bowel and bladder dysfunction
- impotence
- fatigue
- lymphedema

16

Chemotherapy

Used with metastasis and when hormonal therapy alone is not working.

Can be used concurrently with hormonal and other therapy

Docetaxel (Taxotere)

- Given Intravenously
- Given in conjunction with a corticosteroid
- Causes low blood cells 5-9 days after administration.
- Other side effects include fluid retention, n/v/d, neuropathy, hair loss, mouth sores, and fatigue

17

Cryotherapy

- Utilizes extremely cold temperatures to freeze and kill cancer cells
- Used in low-risk patients who are unable to have surgery or radiation
- Used if the patient has reoccurrence after radiation therapy
- Side effects include soreness to the area, hematuria, urinary incontinence, burning sensation to the bladder and rectum, and rarely a fistula between the rectum and bladder.

18

Immunotherapy

Sipuleucel-T (Provenge)-

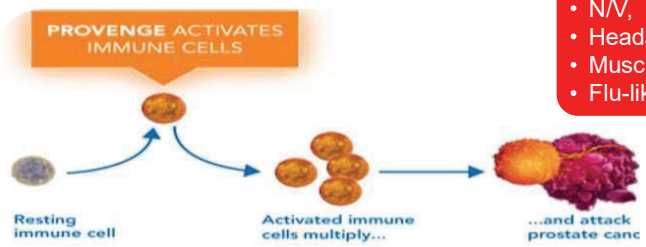
- Referred to as a cancer vaccine
- Patient's white blood cells are extracted through leukapheresis.
- Cells are exposed to Prostatic acid Phosphatase, a protein similar to the protein in prostate cancer cells
- Identify and attack the prostate cancer cells.

Administration:

- Premedication to prevent an infusion reaction.
- Administered IV over one hour;
- The patient is observed at least 30 minutes after the infusion.

Side effects:

- Infusion reactions,
- Fatigue,
- N/V,
- Headache,
- Muscle pain and weakness,
- Flu-like symptoms



19

Supportive Care for Long-Term Side Effects

Bone is the most common site for metastasis from prostate cancer

Pain medications as needed, Bone involvement can be painful

Bisphosphonates- Denosumab (Xgeva) and Zoledronic Acid (Zometa)

- Increase bone strength and mass
- Decrease skeletal-related events such as fractures
- Calcium levels need to be monitored
- Calcium/vitamin D supplements.
- Dental clearance is recommended before administration
- Patient education regarding osteonecrosis of the jaw.

*Dexamethasone- Used with some treatment as a supportive medication for side effects.

20

Survivorship concerns for prostate cancer

- Change in orgasms-may experience a dry orgasm without semen. Glands that produce semen may be damaged or removed during surgery. Orgasm can become less intense and rarely painful.
- Loss of fertility- tissue damage during surgery can make the patient sterile. Prostate cancer patients are usually older
- Erectile dysfunction (Impotence)- Nerve damage or removal during surgery may cause the inability to have a spontaneous erection. At times, aides can be used to produce an erection.

21

Survivorship concerns for prostate cancer

Bowel dysfunction

- can occur with radiation
- Usually resolves but can be permanent.
- Increasing fiber in the diet may help.
- Using a spacer can decrease radiation exposure to the rectum.

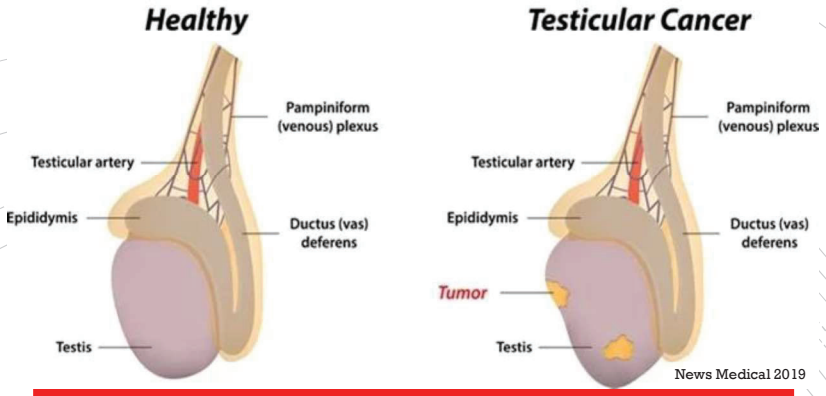
Urinary dysfunction

- Includes stress incontinence, overflow incontinence, and urge incontinence.
- Can occur with radiation (radiation cystitis) S/S frequency, burning on urination, and hematuria.
- Usually resolves, but some men experience permanent incontinence.

Lymphedema

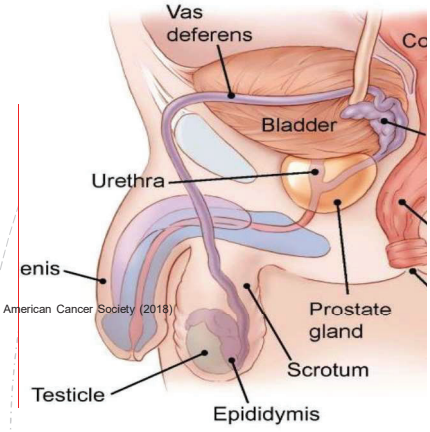
- Possible complication that can cause swelling and discomfort.
- Physical activity can be used to treat this.
- A history of and the treatment of prostate cancer can increase the risk for other cancers.

22



Testicular Cancer

23



Testicles

- part of the reproductive system
- located in the scrotum under the penis.

Main functions:

- Make hormones
- Make sperm

24

Accounts for 2% of all cancers

The most common solid tumor in men aged 15-34 years

Mostly curable (roughly 95%)

Risk factors:

- History of an undescended testicle
- Family history
- HIV
- Carcinoma in situ of the testicle
- Race/Ethnicity: lower in African American and Asian populations than in Caucasians

25

Clinical Manifestations

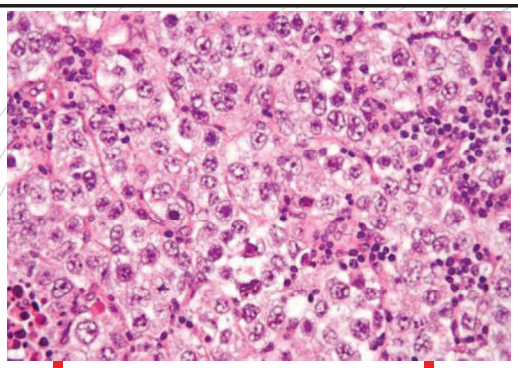
Early symptoms:

- Painless solid growth on testicle
- Breast Abnormalities
- Early puberty

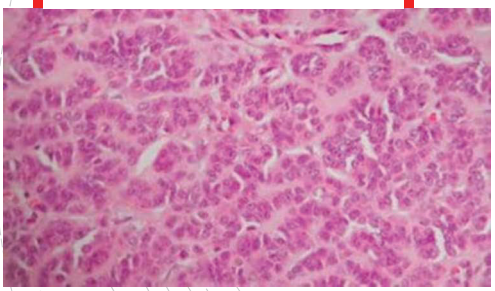
Late symptoms:

- Lower back and/or abdominal pain
- Shortness of breath, chest pain, or cough
- Neurological symptoms

26



Classifications



Germ cell testicular tumors

- Seminomas (classical and spermatocytic)
- Non-seminomas (embryonal carcinoma, yolk sac carcinoma, choriocarcinoma, and teratoma)

Gonadal Stromal Tumors

- Occur in supportive and hormone-producing tissues or stroma
- ~ 5% of testicular cancers not of germ cell origin, interstitial (Leydig and Sertoli cell tumors), granulosa cell tumors, sarcomas, or occult testicular cancers presenting as carcinoma of unknown primary

27

Diagnosis and Staging

Diagnosis

- Testicular ultrasound
- Lab test for tumor markers
- Orchiectomy--biopsy
- CT scan

Staging

- TNM staging system plus Serum (blood) tests
  - Tumor (T)- size of tumor
  - Nodes (N)- lymph node involvement
  - Metastasis (M)- Distant metastasis
  - Serum levels of tumor markers (LDH, HCG, AFP)

28

Treatment Modalities

Surgery

- Radical Inguinal Orchiectomy
- Retroperitoneal Lymph Node Dissection

Radiation

Chemotherapy

High-dose chemotherapy and Stem Cell Transplant

Active Surveillance

29

Care and Complications

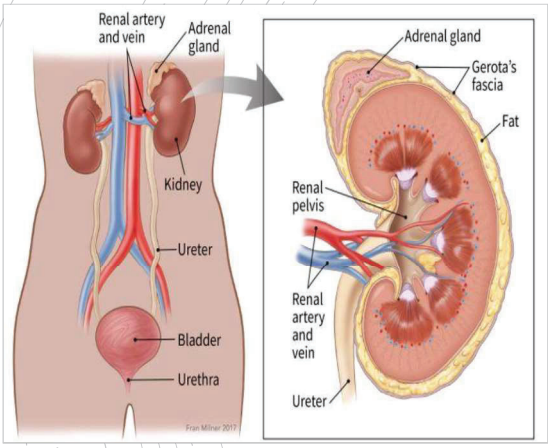
- Monitor long-term effects: fatigue, sexual health, bone health
- Psychosocial support and fertility counseling
- Health promotion: smoking cessation, physical activity
- Survivorship care planning is an essential RN role

30

KIDNEY CANCERS

31

Anatomy



- One kidney on each side of the upper back wall of the abdomen
- Bean-shaped, roughly the size of a fist
- Filters water, salt, and wastes from the blood
- Assist in controlling blood pressure by making renin
- Make erythropoietin to regulate red blood cells

32

Median age at diagnosis is 64 More common in men

Higher incidence in Europe and North America compared with Asia and South America

The average lifetime risk for men is 2% and 1% in women

The 5-year survival rate for localized kidney cancer is 93%, and distant kidney cancer at diagnosis is 13%

Risk Factors

- Smoking
- Obesity
- High blood pressure
- Family history
- Gender
- Race
- Workplace
- Excessive use of acetaminophen
- Advanced kidney disease
- Genetics.

33

Clinical Manifestations

- Early stages may not have any symptoms
- Hematuria
- Unilateral low or mid-back pain
- Mass on the side or back
- Fatigue
- Decreased appetite/weight loss
- Unexplained fevers
- Anemia

34

Types

Renal cell carcinoma

- Arising from renal cortex
- 80-85% kidney cancers
- Clear cell renal cell carcinoma
- Non-clear cell renal carcinoma
- Renal cell carcinoma with sarcomatoid features

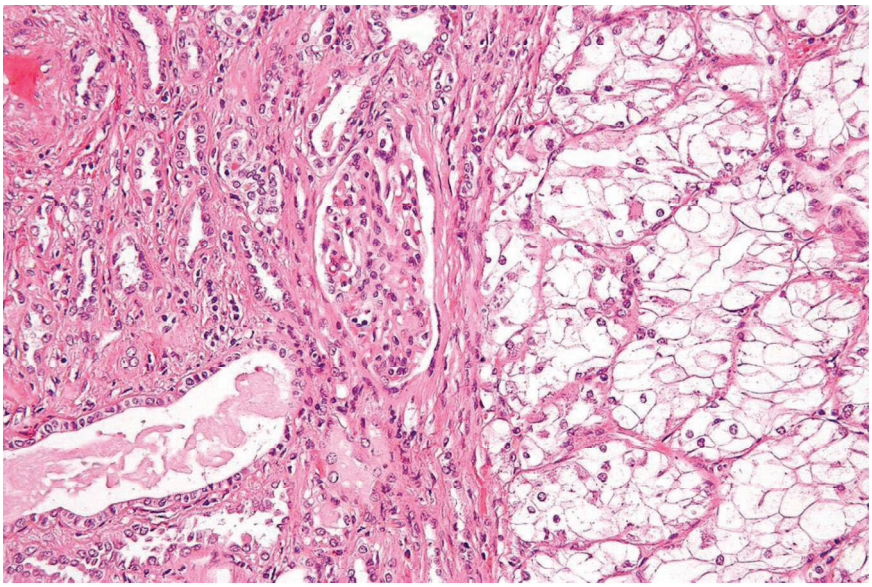
Transitional cell carcinoma

- arising from renal pelvis
- ~ 8% of kidney cancers

Other types

- Wilms tumors—common in children

35



36

Staging and Diagnosis

Staged using the TNM system.

Tools used to help diagnose

- CT chest abdomen pelvis, UA, urine cytology
- Surgery, pathology

Stages

- Localized disease stages I, II
- Localized advanced disease stages III, T4
- Metastatic disease stage IV

37

Treatment

Localized disease

- Surgery is curative in most patients who do not have metastasis (Radical nephrectomy or partial nephrectomy)
- Ablation (cryotherapy, radiofrequency ablation) if not surgical candidate
- Active surveillance

Metastatic disease

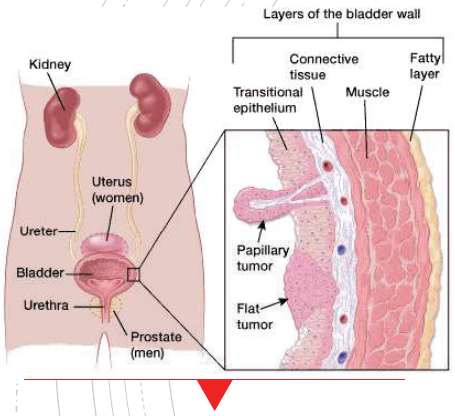
- Surgery-- cytoreductive nephrectomy or resection of metastasis, if possible
- Targeted therapy
- Immunotherapy
- Chemotherapy

38

BLADDER CANCER

39

Anatomy



Located in the lower pelvis

The bladder wall:

- Transitional epithelial tissue
- Connective tissue
- Muscular tissue
- Fatty layer.

Urine:

- Travels from the kidneys
- Through ureters
- Into the bladder
- Out through the urethra

40

Risk Factors

Fourth most common cancer in men, less common in women

9/10 diagnosed are >55 years of age
More common in the Caucasian population compared to African American or Hispanic

Survival rates after 5 years- localized 70% and distant 6%

- Smoking
- workplace exposure
- medications
- arsenic
- liquid consumption
- race
- age
- gender
- chronic bladder infections
- birth defects
- family history
- chemotherapy use

41

Clinical Manifestations

- Difficulty urinating
- Hematuria
- Lower back pain
- Loss of appetite/weight loss
- Fatigue

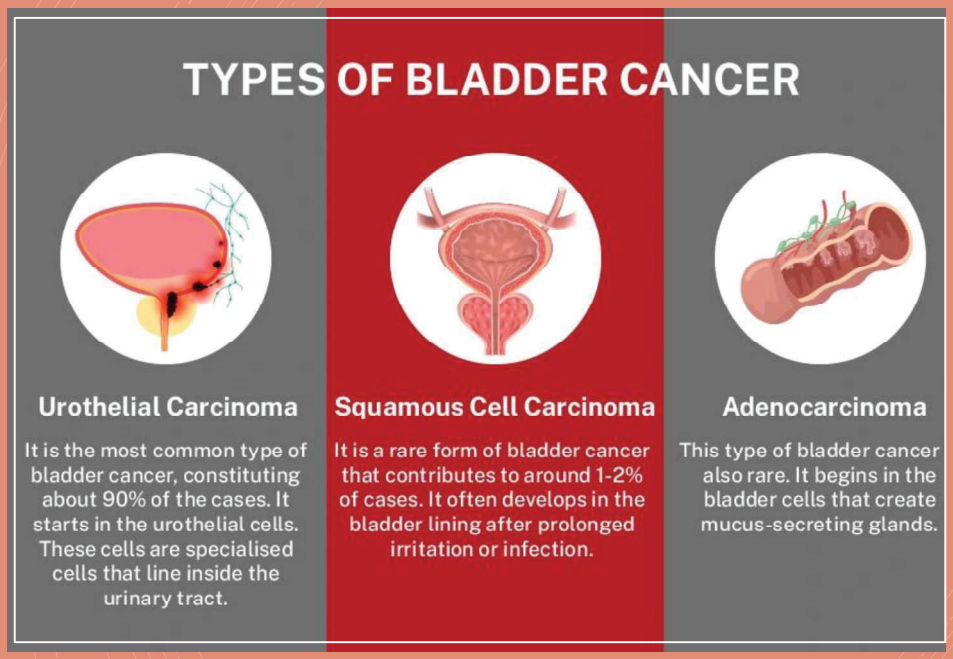
42

Diagnostic tools and staging

Bladder cancer is staged using the TNM system

- Imaging-pyelogram or CT
- Urine sample for cytology and culture
- Urine tumor marker tests
- Cystoscopy
- TURBT transurethral resection of bladder tumor

43



44

Treatment

Non-muscle invasive

- 75% of bladder tumors
- Low risk -TURBT (transurethral resection of bladder tumor) and Intravesical chemotherapy
- Higher risk-- TURBT and BCG chemotherapy

Muscle invasive

- Neoadjuvant chemo, radical cystectomy with urinary diversion
- Radiation and chemotherapy

Metastatic disease

- Chemotherapy, immunotherapy

45

Key Takeaways

- Early recognition of symptoms saves lives
- Treatment is increasingly personalized and targeted
- Immunotherapy requires vigilant monitoring
- Survivorship care is an important concern

46

47

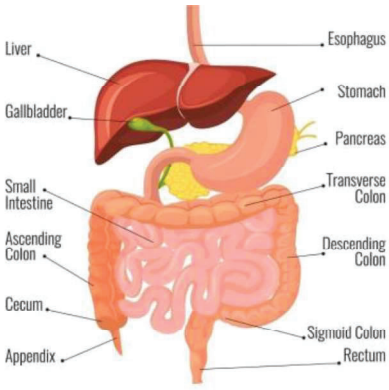
References

- American Cancer Society (2022). Retrieved from https://www.cancer.org/cancer/kidney-cancer/about.html
- News Medical (2019). Retrieved from https://www.google.com/search?q=testicular+cancer&safe=active&rlz=1C1GCEB_enUS984US984&source=lnms&tbm=isch&sa=X&ved=2ahUKEwiDtcvp4pj1AhUumnIEHSHBB6EQ_AUoAXoECAIQAw&biw=1366&bih=620&dpr=1#imgrc=IP8PF6liziL26M
- Up to Date (2022). Retrieved from https://www.uptodate.com/contents/renal-cell-carcinoma-kidney-cancer-beyond-the-basics/print
- Carter, HB, Albertsen, PC, Berry, MJ et al: (2013). Early detection of prostate cancer: AUA Guideline. *Journal of Urology, 190,* 419.
- Drug information retrieved from Chemocare.com
- Häggström, M. (2019b). *Prostate zones* [image]. https://commons.wikimedia.org/wiki/File:Prostate_zones.png
- Kong, L, Zhang, T., Tang, M., & Wang, D. (2014). *The hypothalamic-pituitary-gonadal (HPG) axis* [image]. https://commons.wikimedia.org/wiki/File:Hypothalamic–pituitary–gonadal_axis_in_males.png
- National Cancer Institute. (2019). *Hormone therapy for prostate cancer.* https://www.cancer.gov/types/prostate/prostate-hormone-therapy-fact-sheet#r5
- OpenStax College. (2013). *Sex hormone production* [image]. https://commons.wikimedia.org/wiki/File:Figure_28_03_01.jpg
- Provenge image retrieved from https://prostatecancer.chesapeakeurology.com/about-prostate-cancer/treatment-options-for-advanced-prostate-cancer/autologous-cellular-immunotherapy-provenge/
- Washington manual of Oncology, 4th ed (2022)

48

GI Cancers

- Esophageal
- Gastric
- Colorectal
- Pancreatic
- Hepatic
- Neuroendocrine



Kaitlyn Reeder PA-C
Kaitlyn.reeder@ahn.org
No disclosures

1

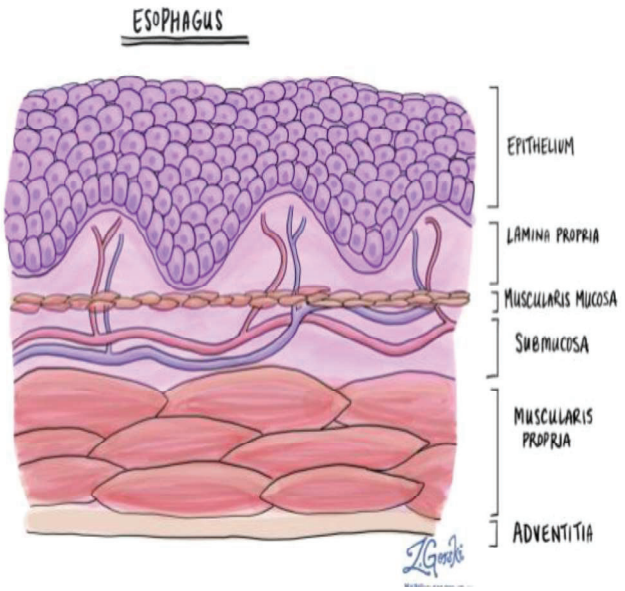
Outcomes

- Review the Anatomy of the GI tract
- Identify Risk Factors of GI cancers
- Recognize clinical manifestations of various GI cancers
- Discuss the treatment modalities used for GI cancers

2

Esophageal Anatomy

- **25-30 cm tube extending from the pharynx to the stomach**
- **Made up of multiple layers**
- **Smooth and skeletal muscle**
- **Mucosa is made up of 3 layers:**
  - **Epithelium *- lined with squamous cells, continuous until the GE junction.**
  - **Lamina propria- thin layer of connective tissue**
  - **Muscularis Mucosa- elastic fibers with smooth muscle cells deepest layer of the mucosa**
- **Adventitia- outermost layer of connective tissue, provides structural support**
- **Lymphatics, vessels and nerves interconnected with associated organs-no mesentery**

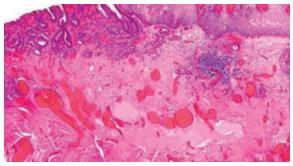


3

Esophageal Cancer Types

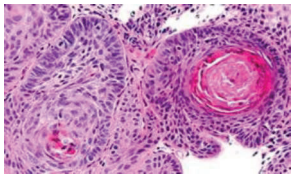
ADENOCARCINOMA

- Arises from mucous secreting glandular cells in the lower third of the esophagus
- Most prevalent type in the US/Western countries
- Risk factors include obesity, smoking, alcohol consumption and Barrett's Esophagus
- Resembles gastric and colorectal cancers
- More favorable prognosis

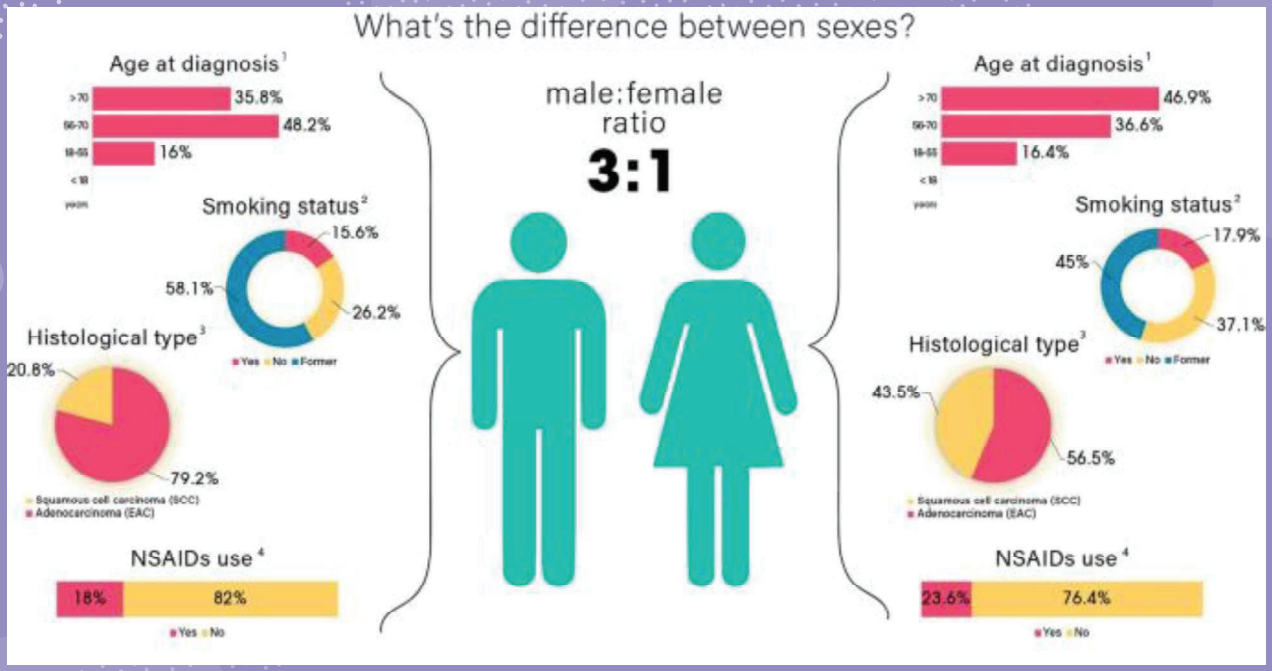


SQUAMOUS CELL

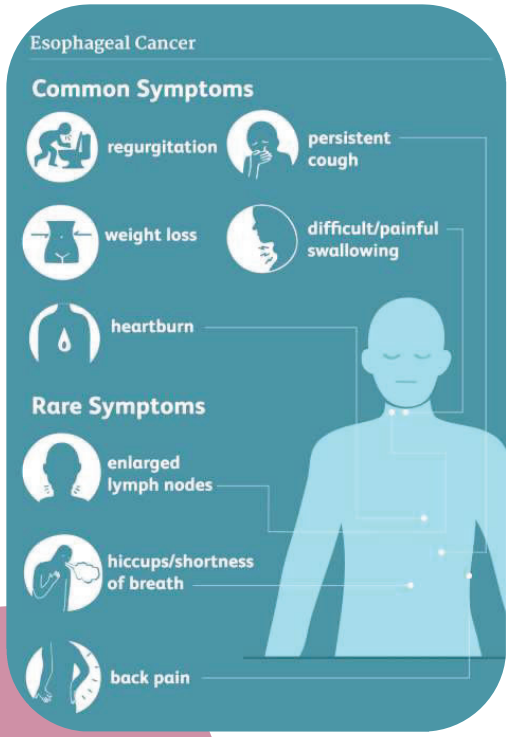
- Arises in the upper 2/3 of the esophagus
- Most prevalent type worldwide
- More common among black populations
- Risk factors include tobacco use, alcohol, nutritional deficiencies, and exposure to irritants
- Resembles some lung, skin and head & neck cancers.
- Less favorable prognosis



4



5



Clinical Manifestations

- Dysphagia with or without pain*
- Inability to clear secretions
- Chest pain/regurgitation
- Unexplained weight loss
- Hoarseness
- Chronic cough
- Fatigue/malaise
- Bleeding/black stools

6

Esophageal Cancer

Pattern of Spread:

- Early lymph mets
- Squamous Cell
  - Upper/middle esophagus
  - Recurs regionally
- Adenocarcinoma
  - Occurs in lower and GE junction
  - Recurs in abdominal nodes and distant organs

Metastatic sites:

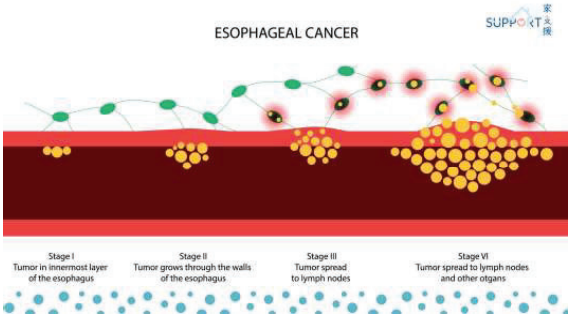
Nonregional lymph nodes

Liver

Lungs

Pleura

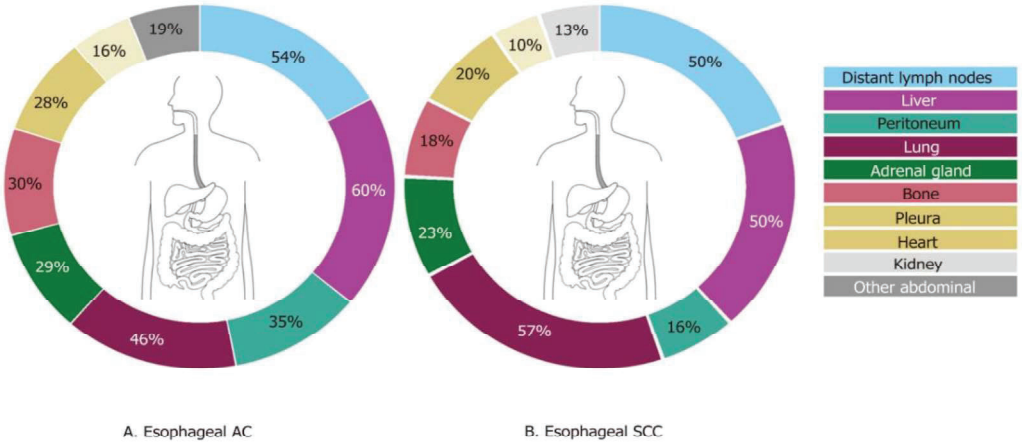
Bones



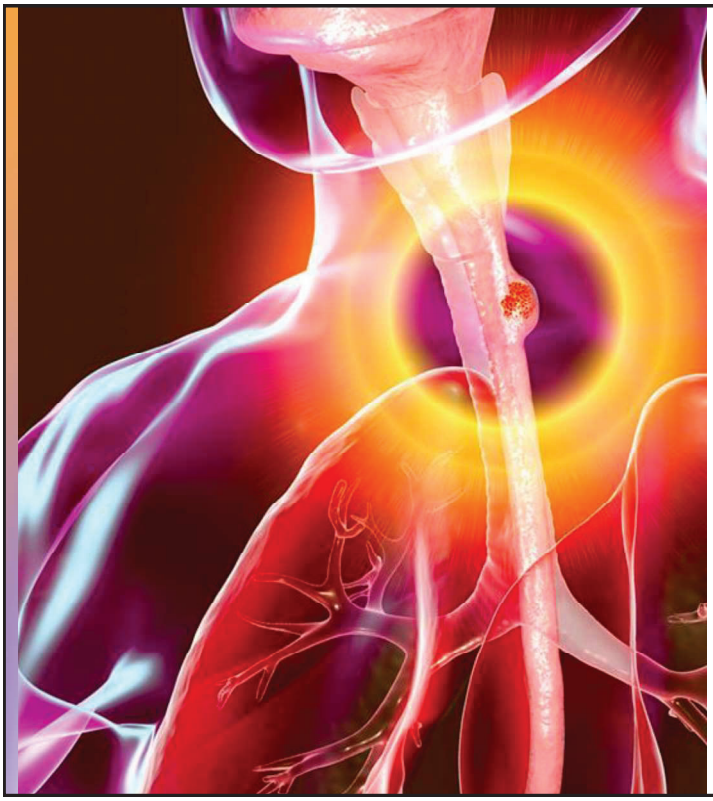
https://support-plus.med.hku.hk/cancer-information.php?id=5dd4c2fe-b1b0-4ea5-b7ea-84562231a9a3

7

Esophageal Metastases



8



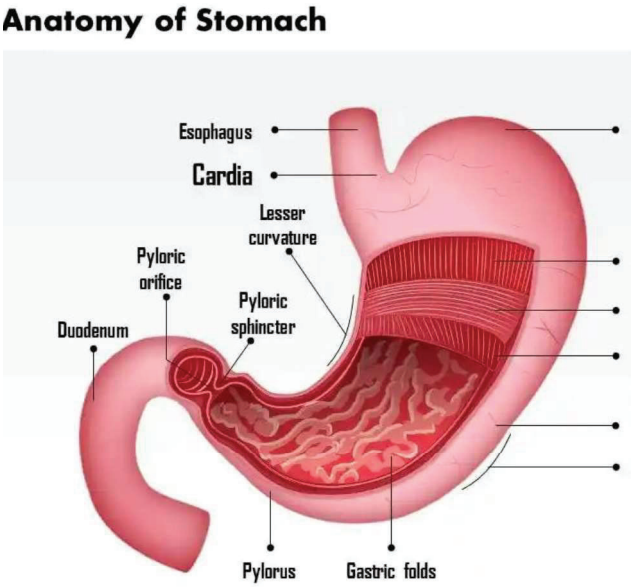
TREATMENT

- Dependent on stage and location
- Early stages (high-grade dysplasia)
  - PDT (photodynamic therapy)
  - RFA (radiofrequency ablation)
  - EMR (endoscopic mucosal resection).
- T1 and higher can include
  - Surgery
  - Chemotherapy (Platinum based with 5FU or taxanes)
  - Radiation therapy (RT)
  - Immunotherapy (PL-1/CTLA-4 Inhibitors)

9

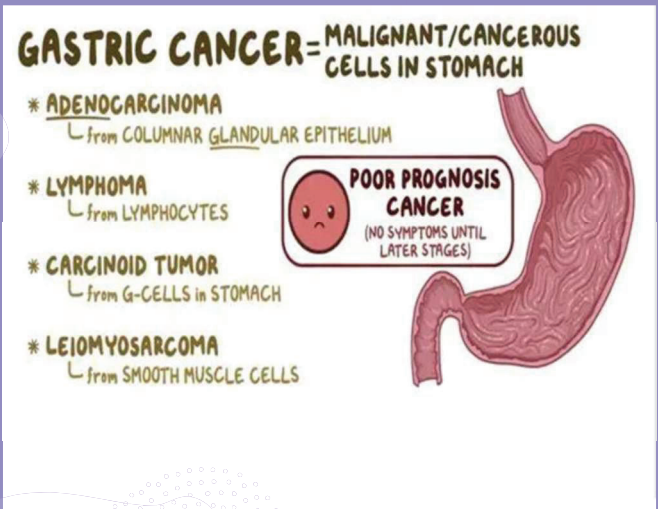
STOMACH (GASTRIC) CANCER

- J shaped reservoir
- Secretes acid and enzymes to assist with food digestion
- Lined with columnar epithelium that secrete mucin



10

Gastric Cancer Types



- Adenocarcinomas make up 90-95% and arise from the gland cells in the inner most lining (mucosa)
- Lymphomas 4%
- GIST (Gastrointestinal Stromal Tumors) uncommon and arise in the interstitial cells of Cajal. These can be malignant or benign.
- Neuroendocrine tumors (NET)
- Squamous cell, small cell and leiomyosarcoma are all rare

11

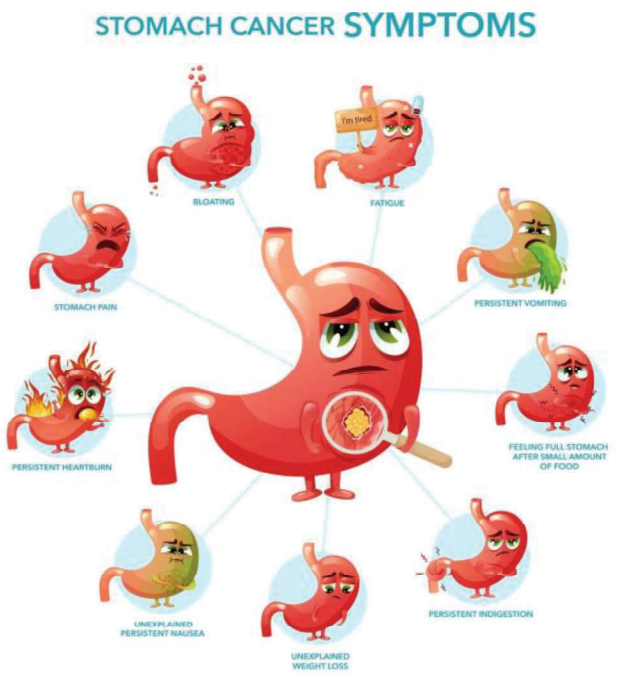
RISK FACTORS

- More common in men than women
- Risk goes up with age; most common in 60's, 70's or 80's.
- In the US, more common in Hispanic Americans, African Americans, Native Americans & Pacific Islanders.
- Worldwide is more common in East Asia, Eastern Europe, and South and Central America.
- H pylori infection
- Obesity
- Smoking and ETOH
- Some inherited cancer disorders (HDGC, Lynch, FAP, GAPPS, Li-Fraumeni, PJS)
- Epstein-Barr
- Environmental factors such as working with coal, metal and rubber
- Having type A blood

12

CLINICAL MANIFESTATIONS

- Indigestion
- Mild nausea
- Loss of appetite
- Unintentional weight loss
- Bloated feeling after eating
- Early satiety
- Vomiting with or without blood
- Fatigue
- Blood in stools



https://www.parkwaycancercentre.com/ae/learn-about-cancer/types-of-cancer/cancer-details/stomach-cancer

13

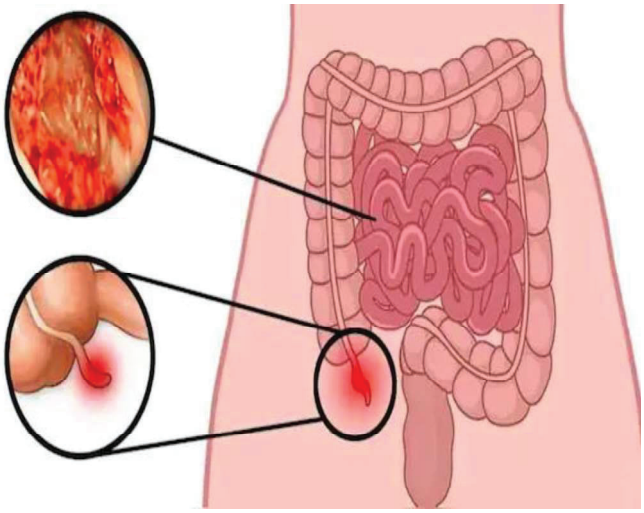
TREATMENT MODALITIES

- Surgery (EMR, partial to total gastrectomy)
- Chemotherapy (adjuvant or neoadjuvant)
- Targeted therapy (drugs that target HER2, VEGF, TRK Inhibitors)
- Immunotherapy (PD-1 Inhibitors)
- Radiation

14

Appendiceal Cancer

- Pouch-like tube attached to cecum, ~10cm in length
- Extremely rare, ~1-2 per 1,000,000
- Average age of onset 50-55 years
  - Increasing diagnoses younger individuals, believed to be due to diet and obesity
- Affect men/women equally
- Neuroendocrine tumors are the most common type



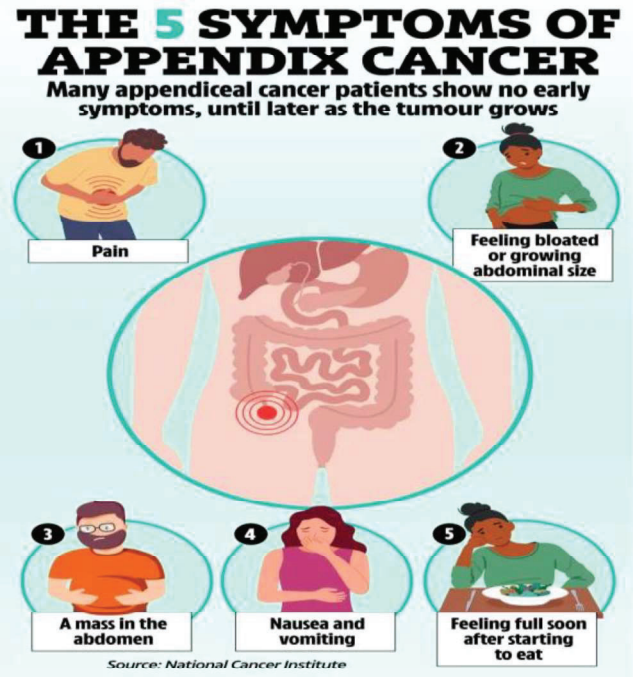
15

Clinical Manifestations

- Appendicitis (RLQ pain)
- Hernia filled with mucin
- Increasing abdominal girth
- Abdominal discomfort
- Abdominal/pelvic mass
- Incidentally on imaging or surgery

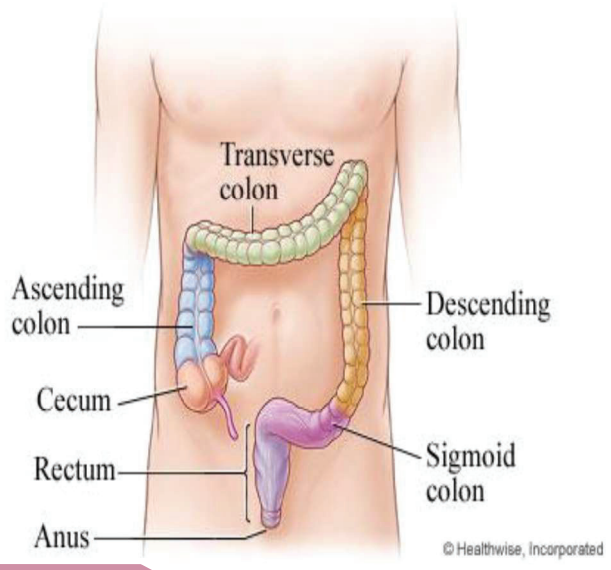
Advanced state

- Ascites
- Intestinal dysfunction or obstruction
- Decreased appetite
- Early satiety
- Nausea, vomiting



16

COLORECTAL CANCER



- The colon is approximately 5 ft long divided into segments:
  - Cecum
  - Ascending colon
  - Transverse colon
  - Descending colon
  - Sigmoid colon
  - Rectum
  - Anus

17

Risk Factors

Age/Gender: Risk increases with age. The average age is 63 and there is a higher incidence in males than females

Race: African Americans have the highest rate of sporadic colon cancer in the US and are more likely to die from their cancer.

Family Hx: 1° relative; especially if they were diagnosed before 60. 5-6% of colon cancers are associated with inherited genetic mutations (Lynch, FAP, JPS, Peutz-Jeghers Syndrome)

Inactivity/Diet: "Western" diet, red meat and processed meats

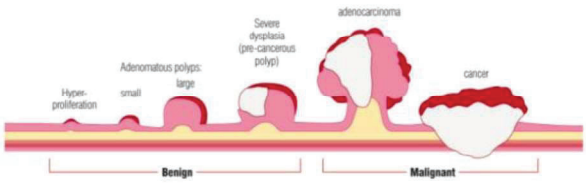
Smoking: More likely to die from their cancer

Cancer.net Editorial Board. (2022, November 17). *Colorectal cancer - risk factors and prevention*. Cancer.Net. https://www.cancer.net/cancer-types/colorectal-cancer/risk-factors-and-prevention?gclid=EAIaIQobChMIz9vJIvTigAMVKM_jBx3LzQLmEAAYAiAAEgI-uvD_BwE

18

COLORECTAL CANCER TYPES

- Adenocarcinoma is most common
- Mucinous and Signet ring are subtypes
- Signet ring is very aggressive with high rates of recurrence
- NET, GIST, Lymphoma & Sarcomas far less common

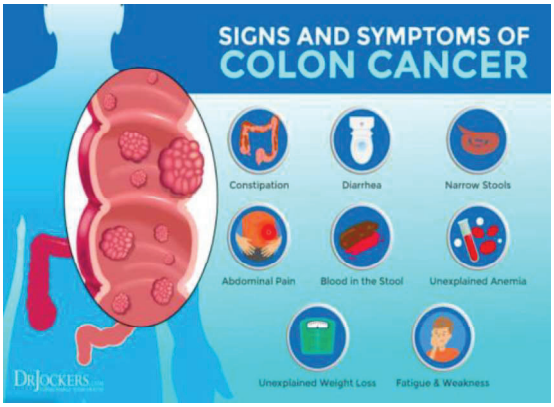


19

CLINICAL MANIFESTATIONS

- Change in bowel habits (pencil stools)
- Tenesmus (the urge to go right after you just went)
- Rectal bleeding
- Blood in the stool
- Abdominal cramping
- Weakness or fatigue
- Unintentional weight loss

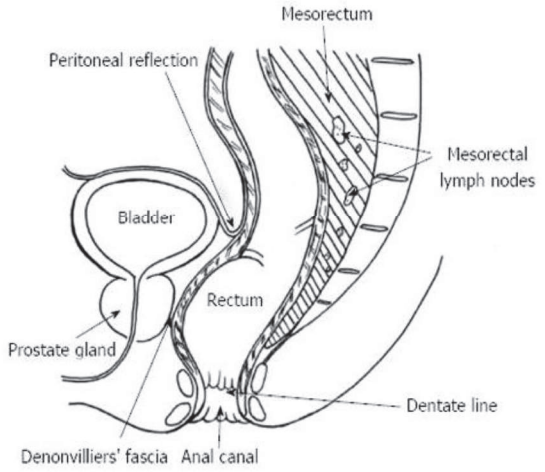
******could have no symptoms at all******



20

COLON CANCER vs RECTAL CANCER

- Location! Location! Location!
- Peritoneal reflection is located 12-15 cm above the anal verge
- Tumors above the peritoneal reflection are considered colon cancer
- Tumors below the peritoneal reflection are considered rectal cancer
- Treatment varies based on location of the tumor



21

Colorectal Cancer Types

Adenocarcinoma

-Most common

-Epithelial

-Arises from colonic mucosa

-Transforms from normal mucosa to invasive cancer over a decade or more

Mucinous-Secrete mucin

-more than 50% tumor mass is extracellular mucin

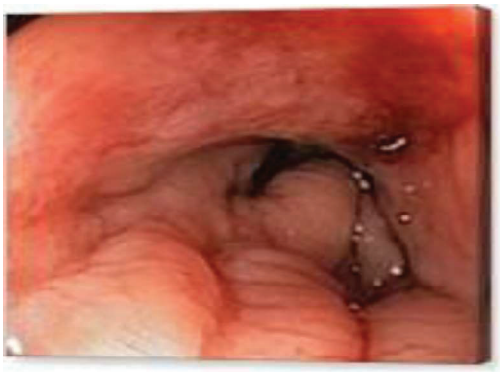
-sigmoid colon and rectum

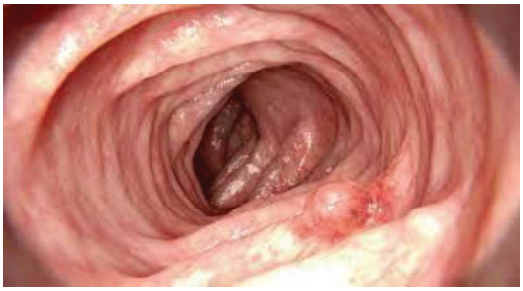
-Higher likelihood of peritoneal and lymphatic spread

Signet ring-mucin stays in the cell of 50% or more of tumor mass

-Very aggressive

22





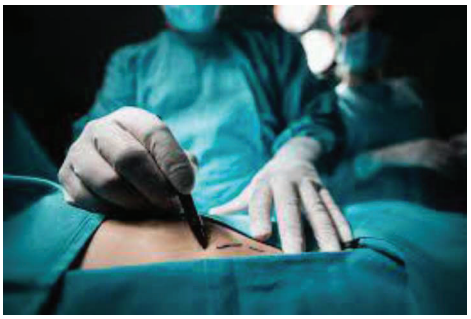
TUMOR EXAMPLES

23

TREATMENT FOR COLON CANCER

- Surgery is the primary treatment
  - Pathology will determine if adjuvant chemotherapy is recommended
    - Stage I & II will not benefit from adjuvant therapy
    - Stage III will usually be referred for treatment (FOLFOX, CAPOX)

*During the staging process, all patients will undergo at CT CAP. If anything is noted in the lung, liver or pelvis, this will be considered Stage IV and the patient will undergo neoadjuvant treatment to address the metastatic disease.



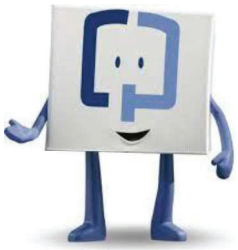
24

RECTAL CANCER TREATMENT

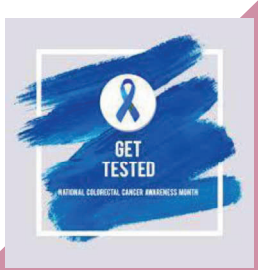
- Combination of chemotherapy, radiation and then surgery
- TNT (Total Neoadjuvant Therapy)
- Capecitabine during radiation (5 weeks)
- 8 cycles FOLFOX/6 cycles CAPOX
- Surgical goal is tumor eradication but also sphincter preservation

25

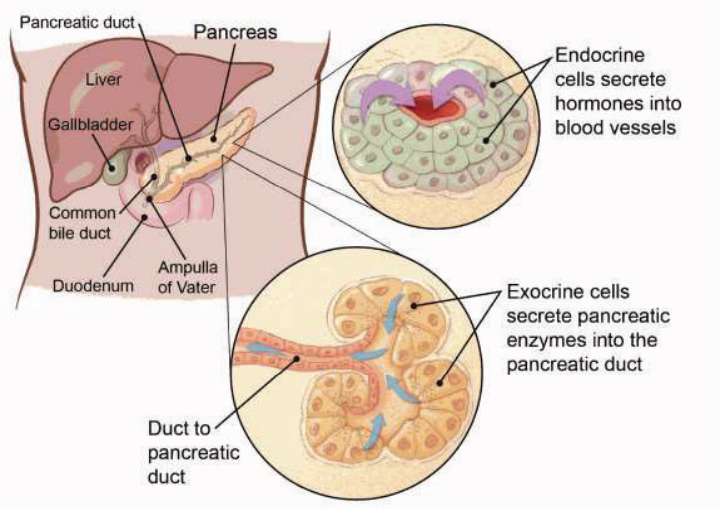
SCREENINGS SAVE LIVES



- ACS recommends people with average risk begin screening at 45
- Stool-based tests
  - FIT (Fecal Immunochemical Test) annually
  - Highly sensitive guaiac-based fecal occult blood test (gFOBT) yearly
  - Multi-targeted stool DNA test (mt-sDNA) every 3 years (Cologuard)
- Visual Testing
  - Colonoscopy every 10 years
  - CT colonography (virtual colonoscopy) every 5 years
  - Flexible Sigmoidoscopy (FSIG) every 5 Years



26



What is pancreatic cancer?: Types of pancreatic cancer. Types of Pancreatic Cancer | American Cancer Society. (2023). https://www.cancer.org/cancer/types/pancreatic-cancer/about/what-is-pancreatic-cancer.html

PANCREATIC CANCER ANATOMY

4 Parts of the pancreas

- Head, body, tail and uncinate process
- Alpha and Beta cells produce hormones, insulin and glucagon
- Acinar cells produce digestive enzymes, lipase, amylase & protease
- Epithelial cells line the ducts

27

PANCREATIC CANCER TYPES

- Adenocarcinoma (Exocrine) makes up 93%
- NET (endocrine)tumors make up approx. 7%

28

Key Differences

Feature	Exocrine Pancreatic Cancer (Adenocarcinoma)	Endocrine Pancreatic Cancer (NETs)
Cell Origin	Ductal epithelial cells	Islet cells (endocrine cells)
Frequency	Very common (>95% of pancreatic cancers)	Rare
Growth Rate	Typically aggressive and fast-growing	Generally slower-growing
Main Symptoms	Jaundice, abdominal pain, weight loss	Variable, depending on hormone
Prognosis	Generally poor	Often better than exocrine cancer
Treatment	Surgery (if resectable), chemo, radiation	Surgery, sometimes targeted therapy, sometimes chemotherapy

29

RISK FACTORS

- Tobacco use
- Obesity
- Diabetes
- Occupational exposure
- Chronic pancreatitis
- Inherited genetic syndrome (Lynch, PJS)
- ETOH
- African Americans are at higher risk

4th leading cause of cancer-related deaths in the US but on track to be the 2nd by 2030

Worst survival rate of any solid tumor

Tumors are both chemo- and radioresistant

30

Clinical Manifestations

* MAY HAVE NO SYMPTOMS AT ALL*

Site dependent

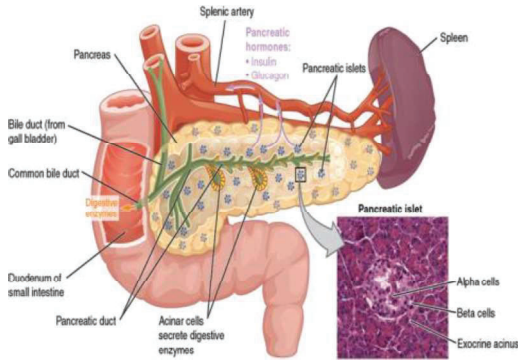
Head-78% compresses CBD causing:

-Jaundice

-Dark urine

-Clay colored stools

-Pruritus



Body, tail or uncinate (non obstructing):

-Unexplained weight loss

-N/V

-Early satiety

-Disabling fatigue

-Diabetes new (or existing may be out of control)

-Pain (abdominal with radiation to back)

Advanced

Gallbladder or liver enlargement

Blood clots (DVT)

Fatty tissue abnormalities

Diabetes new (or existing may be out of control)

31

PANCREATIC METASTESES

- Invades locally and then regionally
- Liver mets is the most common
- Often diagnosed after locally advanced disease and mets
- At diagnosis:
  - ~10% have early stage (1-2) disease
  - 50-55% metastatic disease

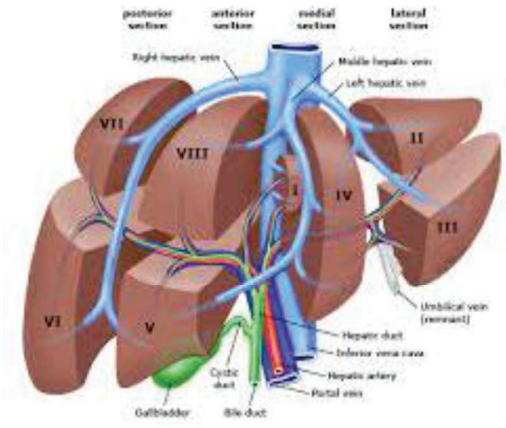
32

PANCREATIC CANCER TREATMENT

- Resectable vs. Unresectable
- Whipple procedure
- Ablation or embolization
- Neoadjuvant and adjuvant chemotherapy
- Radiation (adjuvant or palliative)
- Combination of both
- Targeted therapy

33

LIVER ANATOMY

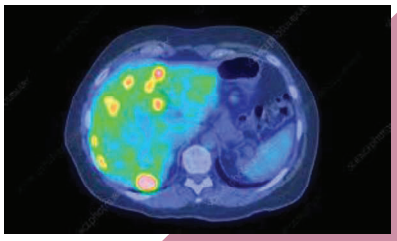


- Located in the upper right quadrant of the abdomen
- Consists of 2 main lobes, a large right lobe and smaller left lobe made up from 8 segments
- Dual blood supply: Hepatic artery, Portal vein
- Responsible for:
  - Production and delivery of bile, certain plasma proteins and cholesterol
  - Regulation of amino acids.
  - Production of clotting factors.
  - Clearance of drugs and other toxins.

34

TYPES OF LIVER CANCER

- Hepatocellular carcinoma (most common)
- Intrahepatic cholangiocarcinoma (bile duct cancer) (10-20%)
- Angiosarcoma and hemangiosarcoma (very rare)
- Hepatoblastoma (rare and develops in children),
- Secondary Liver cancer ⟹ metastatic disease



35

RISK FACTORS

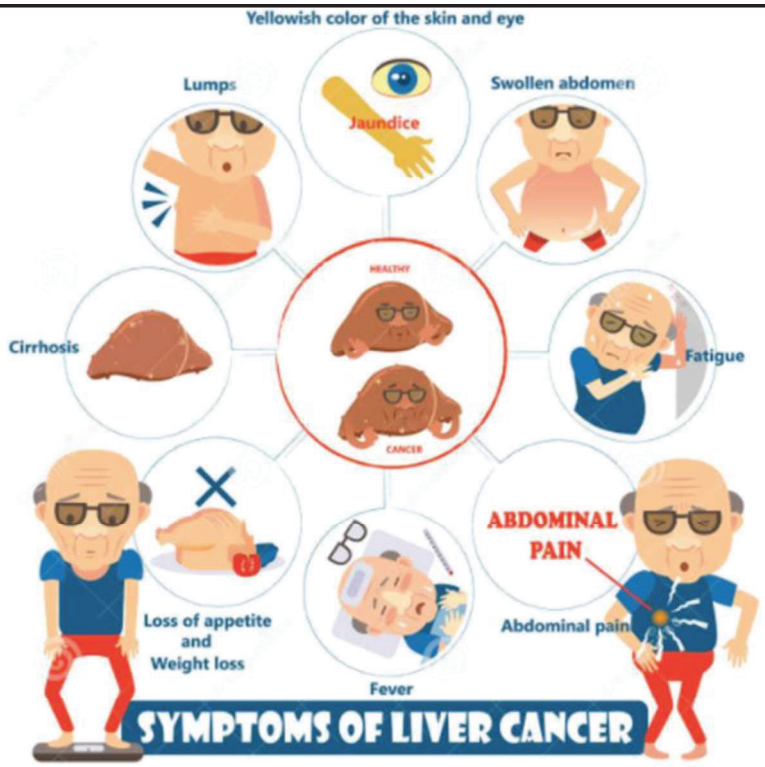
- Cirrhosis
- Hepatitis B
- Hepatitis C
- Environmental toxins: Aflatoxin B1, Betel nut chewing, iron overload
- Lifestyle factors: ETOH & Tobacco
- Metabolic factors: Non-ETOH fatty liver disease, DM, Obesity
- Genetic factors: Hemochromatosis, Alpha-1 antitrypsin deficiency

36

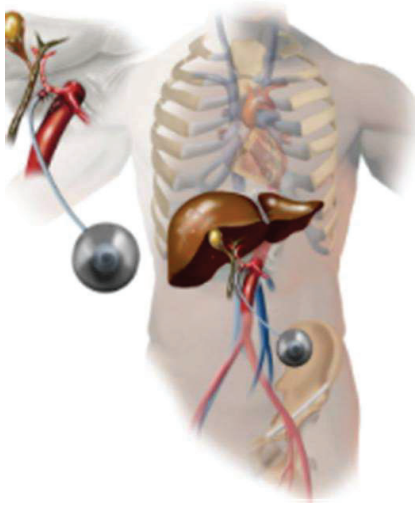
CLINICAL MANIFESTATIONS

May be asymptomatic

- Unintentional weight loss
- Nausea/vomiting
- Early satiety
- Enlarged liver or spleen
- Ascites
- Pain
  - RUQ
  - Becomes severe as advances
  - May radiate
- Jaundice
- Itching
- Bruising
- Fever



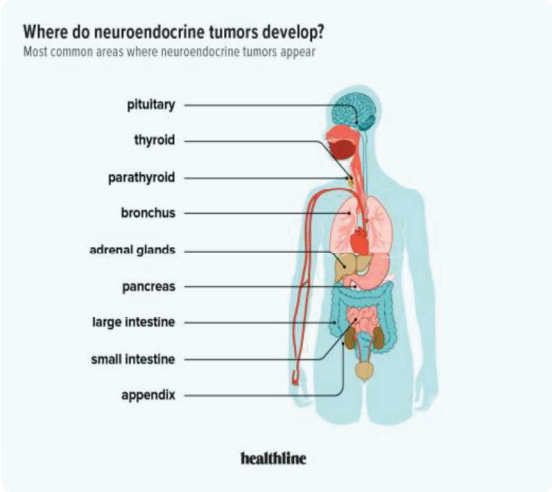
37



LIVER CANCER TREATMENT

- Surgery
- Ablation/Embolization (TACE)
- Radiation (including SIRT/Y-90)
- Targeted therapy & Immunotherapy
- Chemotherapy
- HAI (Hepatic Artery Infusion)

38



NEUROENDOCRINE TUMOR (NET)

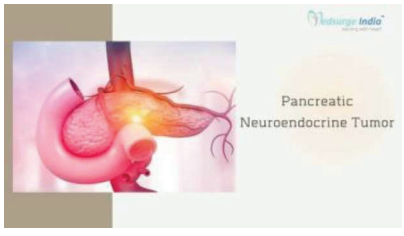
- Begin as specialized neuroendocrine cells possessing hormone producing endocrine traits and nerve cell traits.
- Most take years to develop and grow slowly
- Can be benign or malignant
- Mostly found in the GI tract and lungs but can be in any organ
- Slightly more common in women than men

39

Types

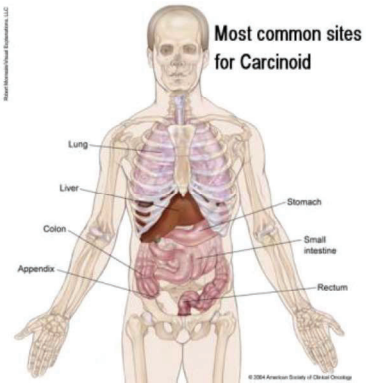
Pancreatic Endocrine Tumors (PanNETs)

- 3-5% of pancreas cancers
- Originates in the islets of Langerhans within the pancreas
- Secretory or non-secretory



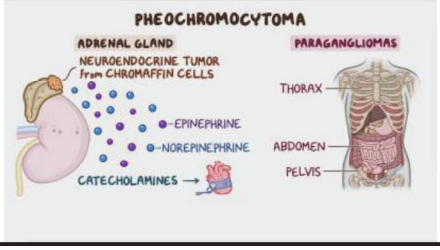
Carcinoid

- Form in many areas of body
- Most common in GI system: stomach, small intestine, appendix and rectum
- Can form in lungs, thymus
- Rare; pancreas, kidneys, ovaries, testes



Pheochromocytoma

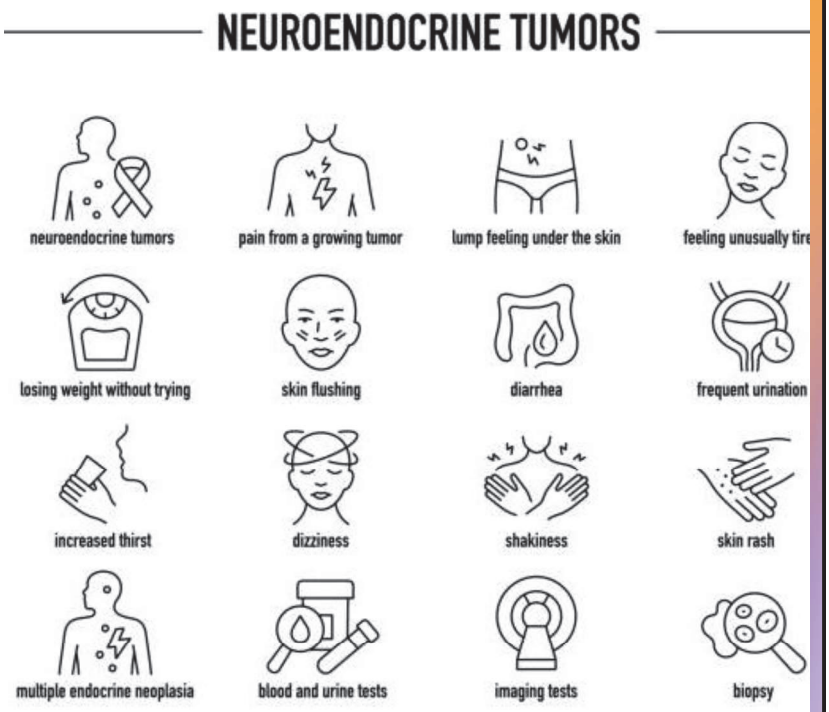
- Originates in the chromaffin cells or extra-adrenal chromaffin tissue of the adrenal glands
- Check Metanephrines, serum or urine



40

NET CLINICAL MANIFESTATIONS

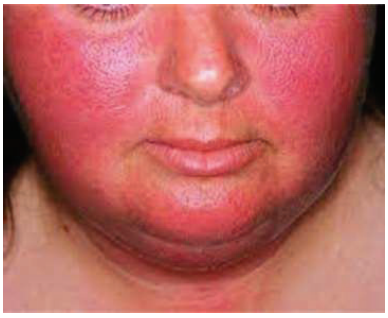
- Sometimes found incidentally
- Fatigue
- Unexplained weight loss
- Hyper or hypoglycemia
- Flushing
- Headache
- Anxiety
- Carcinoid syndrome

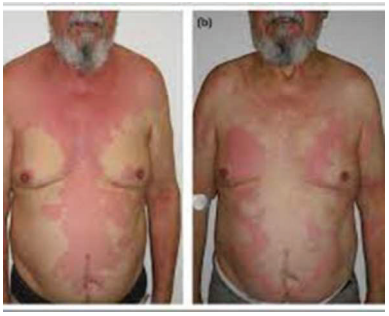


41

CARCINOID SYNDROME

- **Definition:** Carcinoid syndrome is a group of symptoms caused by the release of excessive amounts of hormones (primarily serotonin, but also others) from neuroendocrine tumors (NETs), most often when they have metastasized to the liver.
- **Classic Triad of Symptoms:**
  - **Flushing:** Episodic redness and warmth of the skin, especially face, neck, and upper chest. May be accompanied by itching.
  - **Diarrhea:** Watery, frequent, and often severe. May cause dehydration and electrolyte imbalances.
  - **Bronchospasm:** Wheezing, coughing, shortness of breath. Can be life-threatening.
- **Other Possible Symptoms:**
- Right-sided heart valve disease (murmurs, heart failure)
- Abdominal pain
- Weight loss
- Telangiectasias (small dilated blood vessels)





42

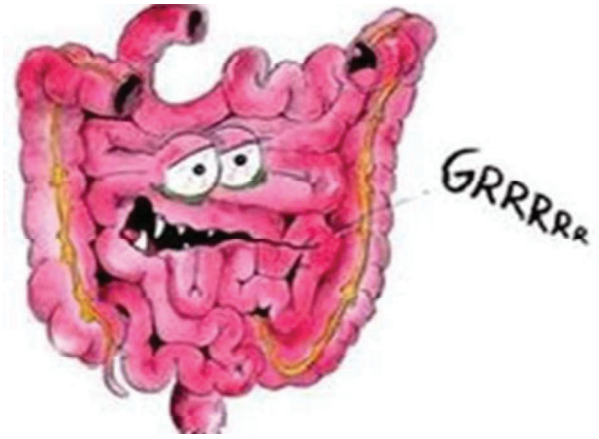
TREATMENT

- Surgery
- Chemotherapy
- Radiation
- Metastatic disease is treated with
  - Somatostatin analogs (octreotide)
  - Molecular targeted therapy
  - Cytotoxic therapy
  - Peptide receptor radioligand therapy (PRRT) (Lutathera)
  - Liver-directed therapy

43

IF YOU DON'T REMEMBER ANYTHING..... REMEMBER THIS.

- All GI cancers can manifest with vague symptoms or no symptoms at all
- Treatment depends on the stage
- Treatment can include surgery, ACT, radiation or a combination of all 3
- Screenings save lives



44

Heather K. Kennihan MSN, RN, OCN
Professional Development Specialist

Breast Cancer 101

Fundamentals of Oncology

February 12, 2026

AHN

*I have nothing to disclose

1

Learning Outcomes

- Discuss incidence of breast cancer
- Identify risk factors and prevention strategies
- Recognize screening and early detection recommendations
- Describe diagnostic tests
- Review breast anatomy
- Recall staging and biomarkers
- Explain treatment modalities
- Give examples of survivorship challenges

2

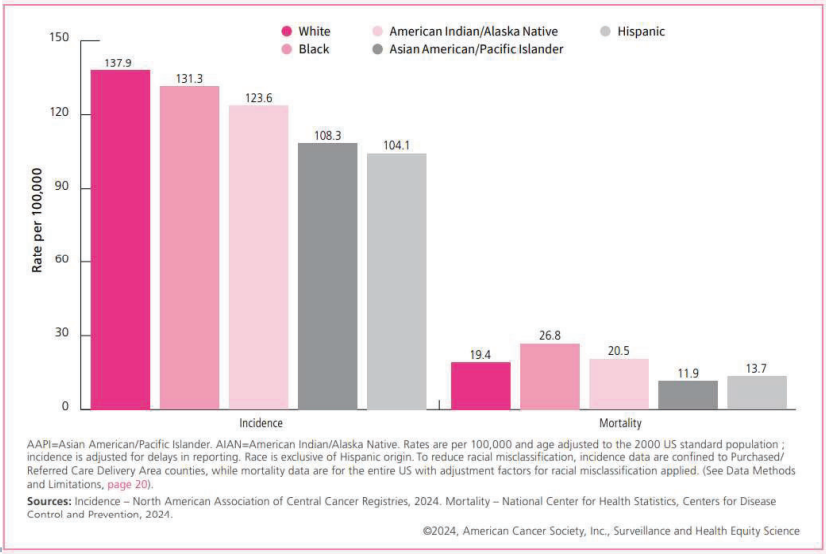
Incidence : 1 in 8 American women

Survival rates:
5 years-91%
10 years- 86% 15 years- 81%

- Second leading cause of cancer related deaths in women
- 2.7 in 100,000 African American men and 1.9 in 100,000 White American men
- Estimated new cases of invasive breast cancer for 2024:
  - 310,720 new cases in women
  - 2,790 new cases in men
- Estimated deaths for 2024:
  - 42,780 women and men
- Death rates have dropped 44% since 1989
- African-American women have 5% lower incidence than White woman, but 38% higher mortality rate.
- Trends are seeing an increase of 1% from 2012-2021 –(1.4% in women younger than 50 compared to 0.7% in women over 50)
- 6-10% will be metastatic upon initial diagnosis

3

Incidence vs. Mortality



AAPI=Asian American/Pacific Islander. AIAN=American Indian/Alaska Native. Rates are per 100,000 and age adjusted to the 2000 US standard population ; incidence is adjusted for delays in reporting. Race is exclusive of Hispanic origin. To reduce racial misclassification, incidence data are confined to Purchased/ Referred Care Delivery Area counties, while mortality data are for the entire US with adjustment factors for racial misclassification applied. (See Data Methods and Limitations, page 20).

Sources: Incidence – North American Association of Central Cancer Registries, 2024. Mortality – National Center for Health Statistics, Centers for Disease Control and Prevention, 2024.

4

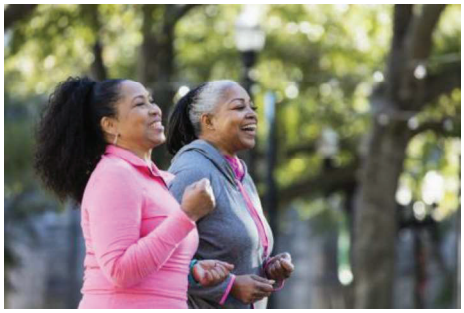
Risk Factors

- Born female
- Age
- Being taller
- Genetics (1:40 Ashkenazi women BRCA 1 +)
- Chest radiation (especially before the age of 30)
- Hormone exposure
- Reproductive history
- Family history-breast, ovarian, pancreatic, prostate, melanoma
- History of benign breast disease (Atypical Hyperplasia)
- Alcohol
- Increased body mass
- Being physically inactive
- Dense breast tissue

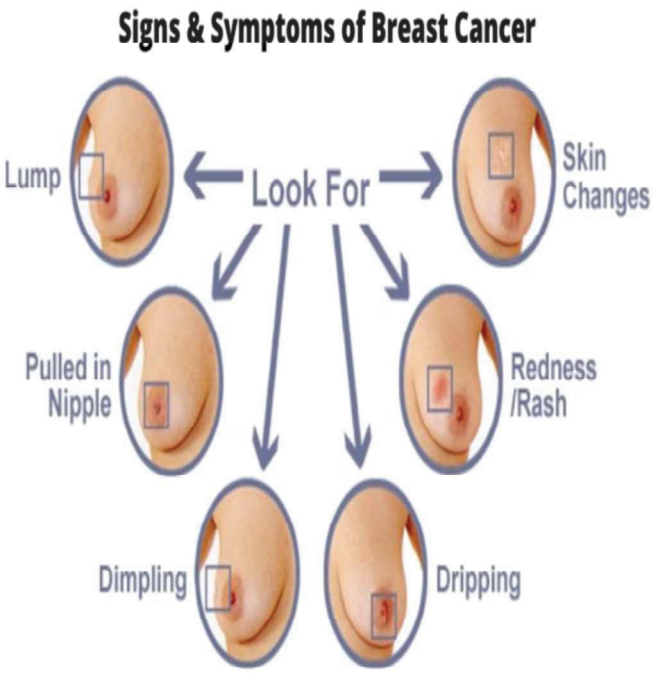
5

Prevention

- Healthy lifestyle
  - Decrease weight
  - Exercise
  - Limit alcohol
  - Decrease smoking
- Breast Feed children for 1 year
- Have children prior to age 30
- Chemoprevention with Tamoxifen or Raloxifene for those with high-risk breast lesion
- Prophylactic mastectomy and/or prophylactic bilateral salpingoophrectomy for BRCA +



6



- New lump or mass
- Swelling of all or part of a breast (even if no lump is felt)
- Skin dimpling (sometimes looking like an orange peel)
- Breast or nipple pain
- Nipple retraction (turning inward)
- Nipple or breast skin that is red, dry, flaking or thickened
- Nipple discharge (other than breast milk)
- Swollen lymph nodes

Screening Recommendations for Women of Average Risk

- **Annual mammograms** starting at age 40 are recommended by: National Comprehensive Cancer Network, the Society of Surgical Oncologists, The American Society of Breast Surgeons, the American College of Radiology and the Society of Breast Imaging
- **Mammograms every 1-2 years** starting at age 40: American Congress of Obstetrics and Gynecology,
- **American Cancer Society (ACS)** -age 40-44-have the **OPTION** of annual screening MXR and **Recommends** starting at age 45-54 annually. At 55-then Q 2 years if negative or annually. Screening should continue as long as women as expected to live 10 or more years.
- **United States Preventive Task Force**-40-74 have biennial screening- new as of 2024
- **Self-breast exams monthly** - typically not taught anymore, encourage to be self aware

Mammogram and Ultrasound

- 2D Digital Mammograms
  - Calcifications
  - asymmetry
- 3D mammograms (tomosynthesis)
  - Calcifications
  - Asymmetry
  - Slices of breast in image
- Standard Ultrasound
  - masses
- Whole breast ultrasound
- MRI

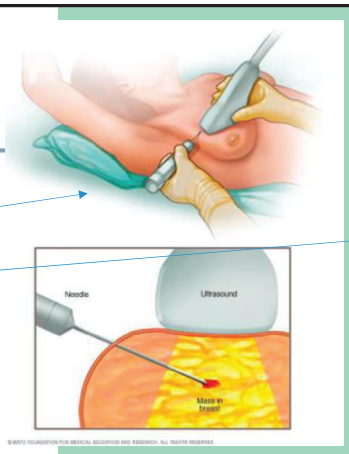
Diagnostic Testing

First steps:

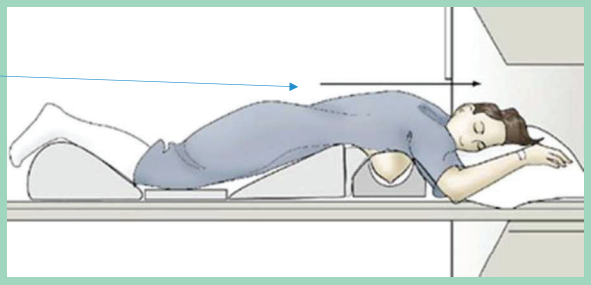
- Abnormality found on screening mammography or palpated mass
- Diagnostic mammogram and ultrasound
  - This will apply to their copays and deductibles
  - These imaging studies will focus on a targeted area under magnification
- Biopsy
- MRI

Biopsies

- Ultrasound guided
- Stereotactic

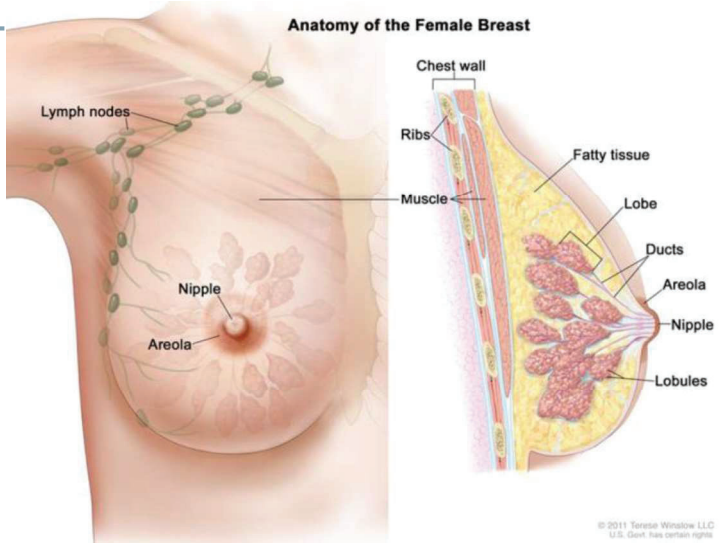


- Tomo-guided-asymmetry
- MRI directed-focused ultrasound on the area was seen on the MRI
- MRI biopsy-mass seen on MRI
- Excisional-Surgical removal (<1% of AHN Cases)



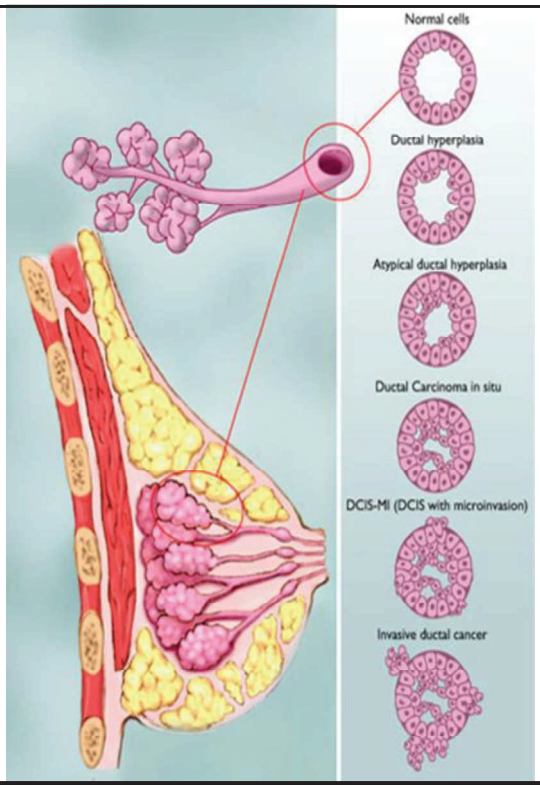
Anatomy

- Female
  - Fatty tissue
  - Glandular tissue
  - Lobules and Lobes
  - Ducts
    - Male ductal system underdeveloped due to influence of testosterone during puberty and does not have lobules or lobes



Pathophysiology

- Starts in epithelial cells
- Proliferates
- Ductal or Lobular
- Breaks through the cell wall
- Spreads to lymph nodes
- Spreads to other body systems



Types of Breast Cancer

Invasive Cancers (80%)

- Invasive Ductal Carcinoma (IDC)-80%
- Invasive Lobular Carcinoma (ILC)-10-15%
- Inflammatory-1-5%
- Mucinous-2-3%
- Paget's-<5%
- Tubular-1-4%
- Papillary -1%
- Phyllodes Tumor-<1%

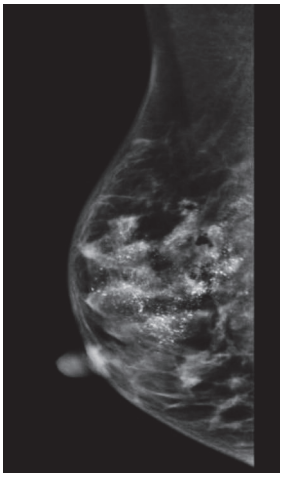
Non-Invasive Cancer (20%)

- Ductal Carcinoma In Situ

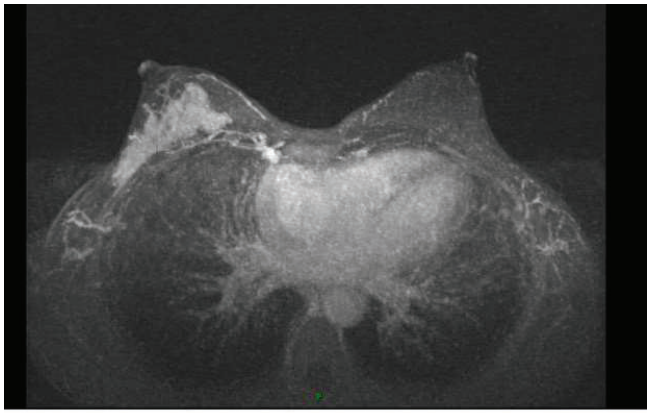
Example:

1. LEFT BREAST, 2 O'CLOCK, ULTRASOUND GUIDED CORE BIOPSY:
A. INVASIVE LOBULAR CARCINOMA, INTERMEDIATE NUCLEAR GRADE, NOTTINGHAM HISTOLOGIC

Ductal Carcinoma In Situ (DCIS)- Mammogram

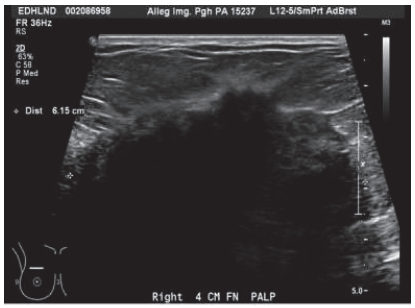


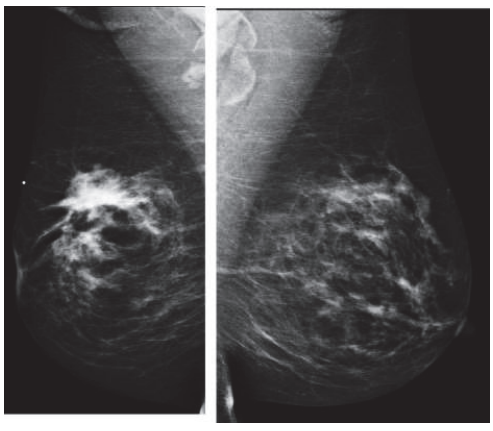
Ductal Carcinoma In Situ (DCIS)- MRI



17

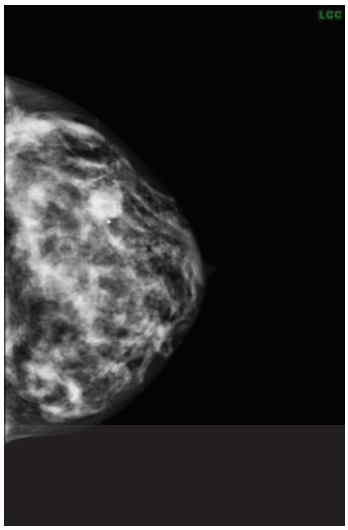
Invasive Lobular Carcinoma (ILC) Presented with palpable thickening

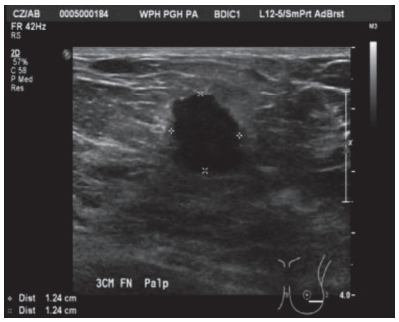




18

Invasive Ductal Carcinoma (IDC) Presented with palpable mass





19

Additional Testing

Second steps:

- Referral to surgeon and/or medical oncology
- Bilateral breast MRI
- Biopsy of any additional breast lesions or suspicious lymph nodes
- CT/bone scan
- PET/CT scan
- Labs: Cancer antigen 15-3 (CA 15-3), Cancer antigen 27.29 (CA 27.29) and Carcinoembyonic antigen (CES) –typically for metastatic disease
- Genomic testing-
- Genetic counseling

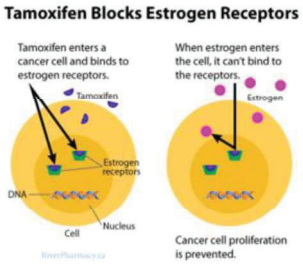
20

Staging- American Joint Committee on Cancer (AJCC)

- Clinical staging vs. Pathological staging
- Tumor-size of mass
- Nodes-number of nodes involved
- Metastatic-any disease extension
- ER/PR – are they + or -
- Her2/Neu- is this + or -
- Grade-1,2 or 3
- Oncotype DX or Mammoprint

Receptors-Estrogen(ER) and Progesterone (PR)

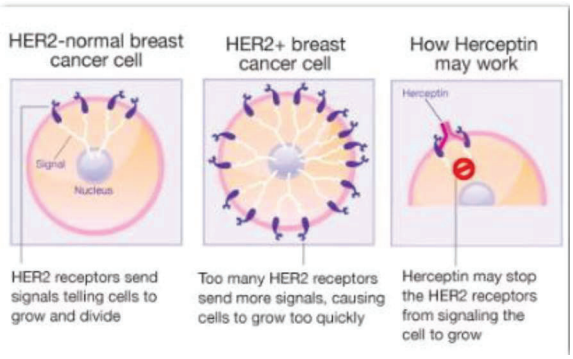
Pre-menopausal- lots of estrogen floating around



- Post-menopausal- prevents the conversion of steroids made by the adrenal gland into estrogen.
- LESS circulating estrogen to bind to cell
  - Arimidex (anastrozole)
  - Aromasin (examestane)
  - Femera (letrozole)

Receptors

- Her2/Neu- (human epidermal growth factor type 2 receptor)



- Trastuzumab (Herceptin)
- Perjeta
- Margenza
- Nerelynx (PO)

- Biosimilairs:
  - Herzuma(2018)
  - Trazimera (2019)
  - Kanjinti (2019)
  - Hercessi (2024)

- Mets: Enhertu, Kadayla

Molecular Subtypes

- **Luminal A Like**
  - Estrogen (ER) and Progesterone (PR) positive-low
  - HER2/Neu negative
  - Low Ki-67
  - Grade 1 or 2
- **Luminal B Like**
  - Estrogen (ER) and Progesterone (PR) positive-high
  - HER2/Neu negative
  - High Ki-67
  - Grade 3
- **HER2 /Like**
  - HER2/Neu Postive
  - ER/PR – or +
  - Generally, grade 3
- **Basal Like**
  - Estrogen (ER) and Progesterone (PR) negative
  - HER2/Neu negative
  - Grade 3

Grading and Gene testing

- Grade- 1,2 or 3-done with biopsy
  - How much the cells look like normal tissue cells
  - More differentiated- the more aggressive the cancer

  Typcially done after surgery
  - Oncotype DX
    - 21 gene test
  - Mammoprint
    - 70 gene test

Staging

- Stage 0-Non-invasive cancer
- Stage I (IA and IB)-tumor size < 2cm with 0 lymph node involved
- Stage II (IIA and IIB)-tumor size >2cm and lymph node involved or 1-3 lymph node without tumor in breast or tumor between 2cm- 5cm without lymph node involved.

Staging

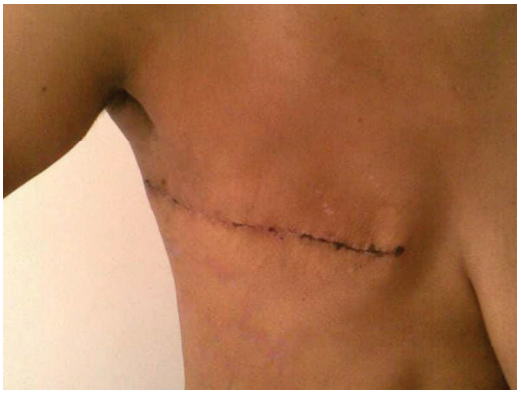
- Stage III
  - IIIA-tumor any size with 4-9 lymph nodes involved or tumor >5cm with 1-3 lymph nodes involved
  - IIIB-Tumor is spread to chest wall, or is inflammatory, it may or may not have spread to up to 9 lymph nodes
  - IIIC-Tumor of any size and has spread to 10 or more lymph nodes
- Stage IV-any size tumor, any lymph node, and bone, lung, brain, liver, peritoneum involvement

Early Stage Treatment Modalities-Surgery

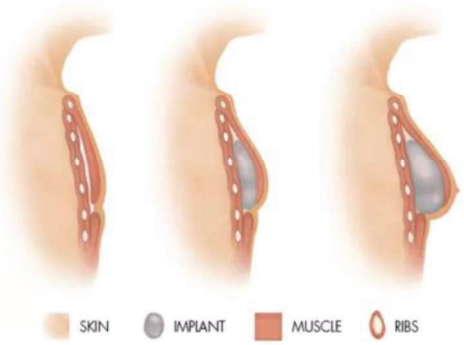
- **Surgery**
  - Breast conserving surgery
    - Partial Mastecomy (lumpectomy)
  - Partial vs. total mastectomy
  - Axillary lymph node biopsy vs. Lymph node dissection
  - Breast reconstruction
    - Oncoplasty
    - Implants
    - Muscle flaps

Early Stage Treatment Modalities-Surgery

Simple Mastectomy



Expander to Implant



Early Stage Treatment Modalities (ACT)

Chemotherapy (Neoadjuvant or adjuvant)

- Multiple agents include anthracyclines, platinums, taxanes, targeted therapies, 5-FU, methotrexate, cyclophosphamide-
- PO agents-Verzenio, Capcitabine, Tucatinib, Ibrance

Hormonal therapy

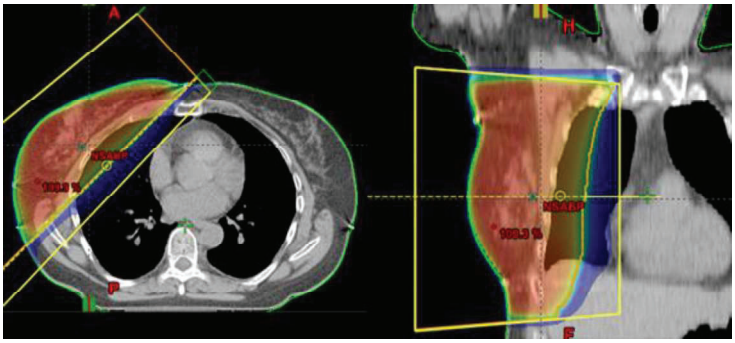
- **Premenapausal** (Tamoxifen or Raloxifine)
- **Post Menapausal** (Arimidex (anastrozole), Aromasin (examestane), Femera (letrozole))

Early Stage Treatment Modalities-Radiation

- Whole breast +/- axilla and supraclavicular nodes
- Partial breast
- Boost
- Gamma pod (1-3 day treatment)

- Second opinions

Whole breast irradiation



Stage III or IV Treatment Modalities

- **Surgery**
  - Breast conserving surgery-dependent on breast size
  - Partial vs. total mastectomy
  - Axillary lymph node biopsy vs. dissection
  - Breast reconstruction
- **Chemotherapy**
  - Multiple agents include anthracyclines, platinums, taxanes, targeted therapies, 5-FU, methotrexate, cyclophosphamide- PO agents
- **Hormonal therapy**
- **Radiation Therapy**

Short and long term complications from ACT

- **Cardiac**
  - CHF, Arrhythmias, SOB, Pedal Edema
- **Neuro**
  - Peripheral Neuropathies
- **Heme/Metabolic**
  - Neutropenia, Anemia, thrombocytopenia, Electrolytes, elevated liver enzymes
- **GI**
  - Taste changes, N/V/D/C, mucositis, esophagitis, GERD

Complications and Survivorship Issues

- Infection
- Seromas
- Wound dehiscence
- Lymphedema to the chest, back and arm (Occurs when the lymphatic system, responsible for draining excess fluid, is damaged or altered by surgery and/or radiation therapy)
- Extra skin (dog ear)
- Decreased ROM
- Body image
- Sexuality

Case Study

45 year old female with invasive ductal carcinoma diagnosed after screening mammogram and biopsy in Right breast. Her family history shows her sister and aunt have had breast cancer. She has 3 children, 1 boy and 2 girls. Her mass is 4cm and it is palpable. She has seen the surgeon and has elected to have a mastectomy and lymph node biopsy. Her tumor markers were ER/PR positive, HER 2 negative, 0 out of 2 lymph nodes were positive for cancer.

What happens after her surgery?

Is she a candidate for ACT?

Is she a candidate for Radiation?

Does she get Hormonal therapy?

Summary

- Know your risk factors
- Screening Mammograms annually starting at age 40
- Treatment modalities include surgery, anticancer therapy, radiation, and clinical trials
- Endocrine therapy recommended for 5 years for ER Positive
- Long term side effects and survivorship issues can be improved

References-

American Cancer Society (2024). Retrieved on January 15, 2025. www.cancer.org.

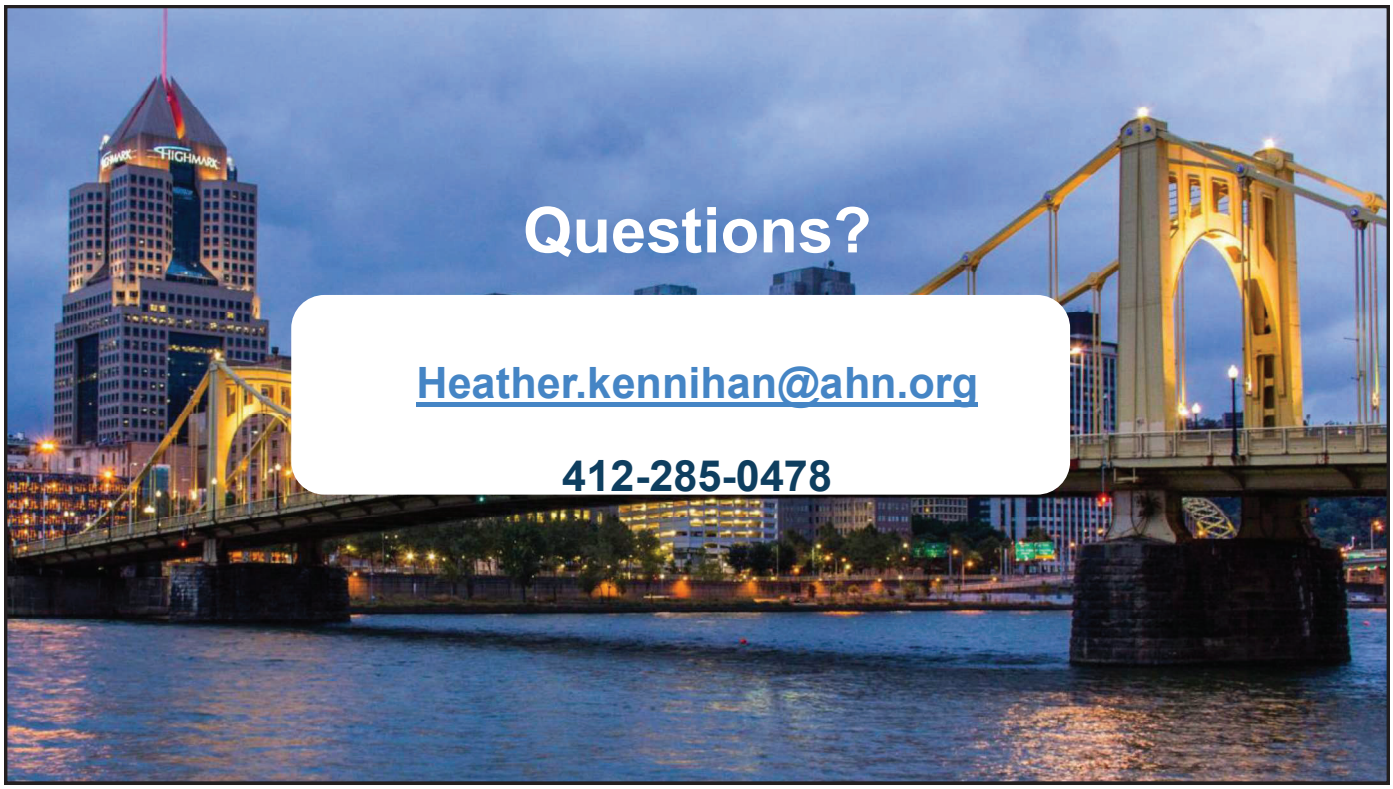
American College of Obstetricians and Gynecologist (2025). Retrieved on January 16, 2025. Mammography and Other Screening Tests for Breast Problems | ACOG

Mahul, Amin. (2024).*AJCC Cancer Staging System*. American College of Surgeons. 8th ed.,version 9.

National Cancer Institute (2024). Retrieved on January 15, 2025. www.cancer.gov.

U.S. Preventive Services Task Force (2024). Retrieved on January 15,2025. https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/breast-cancer-screening

Yarbro C., Wujcik D., & Holmes B., (2018) Cancer Nursing: *Principles and Practice*. Jones&Barlett Learning.


Questions?
Heather.kennihan@ahn.org
412-285-0478

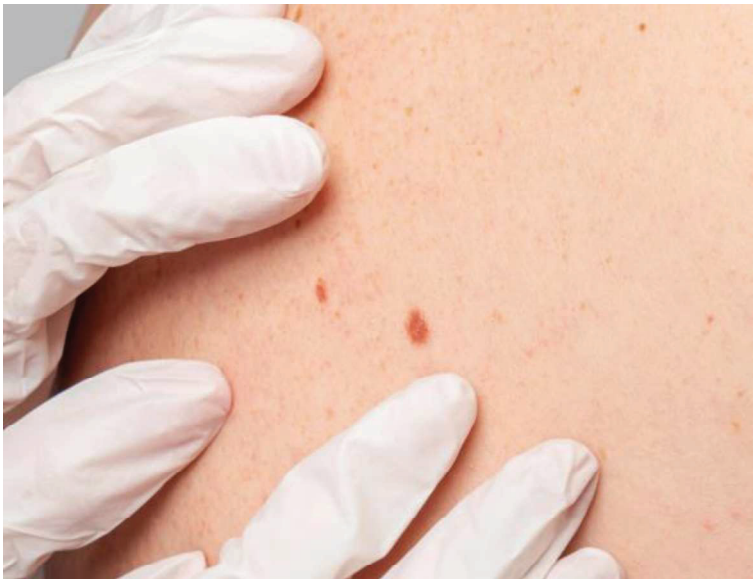
SKIN CANCER

JENNA ROWE, MSN, FNP-BC

1

OBJECTIVES

- State risk factors of skin cancers
- Describe common skin cancers and their characteristics
- Identify screening, early detection and prevention strategies



2

RISK FACTORS

- ULTRAVIOLET RAY EXPOSURE (UV)/ REPEATED UNPROTECTED EXPOSURE TO SUNLIGHT
- TANNING BED USE
- LIGHTER SKIN TONES
- AGE
- EXPOSURE TO CERTAIN CHEMICALS- ARSENIC, COAL TAR, PARAFFIN, PETROLEUM PRODUCTS
- RADIATION EXPOSURE
- SEVERE SKIN INFLAMMATION OR INJURY/ BURN
- PREVIOUS SKIN CANER
- IMMUNOSUPPRESSED STATUS
- SMOKING
- HPV

3

SCREENING AND EARLY DETECTION

- Recommend annual screening by a dermatology provider
- Skin self exam
  - Perform skin exam in a well-lit room in front of a full-length mirror. Use a handheld mirror for areas that are hard to see such as the scalp, back, groin and back of legs.
- What to look for?
  - Painful, bleeding scabbing or itch lesions
  - Non healing skin lesions
  - ABCDE of skin cancer

4

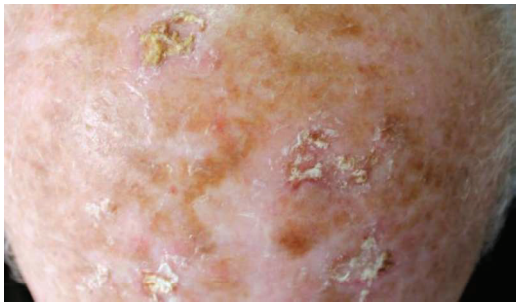
SKIN CANCER PREVENTION

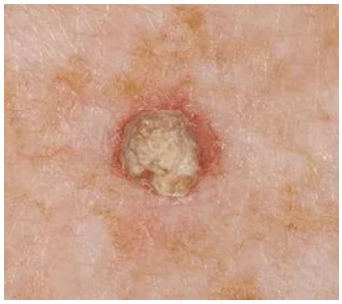
- Limit exposure to ultraviolet light
- Use sunscreen (SPF 30 or greater)
- Eliminate tanning bed use
- Perform monthly skin exams
- Avoid harmful chemicals
- Encourage smoking cessation
- HPV vaccine

5

ACTINIC KERATOSIS

- Can Progress to Squamous Cell Skin Cancer
- Flat or slightly raised
- Scaly or crusty rough patch
- May have a raised horn or bump
- Frequently on UV exposed areas
- Treatment can include
  - Surgical procedures, topical creams
  - Photodynamic therapy, combination therapy

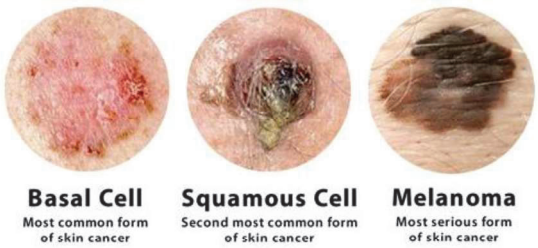


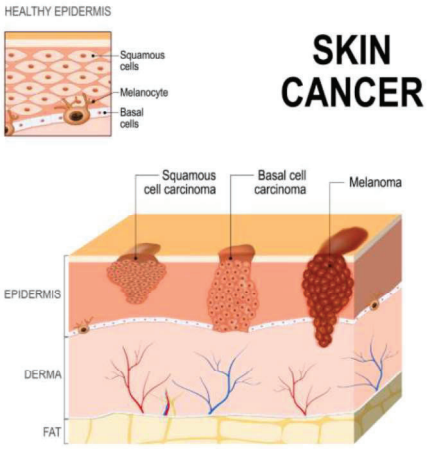


6

MOST COMMON TYPES OF SKIN CANCERS

- Basal Cell Carcinoma
- Squamous Cell Carcinoma
- Melanoma

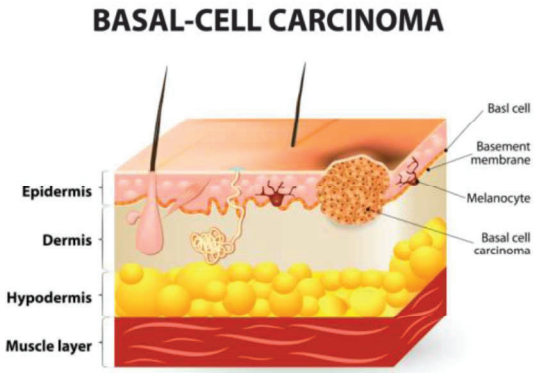




7

BASAL CELL CARCINOMA

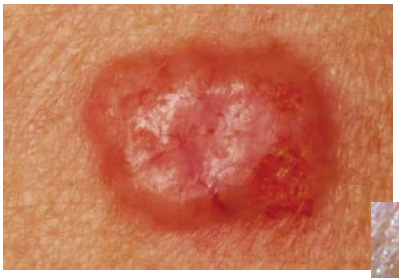
- Most common type of skin cancer
- Begins in the basal layer, which is the lower part of the epidermis
- Slow growing
- Although rare, if left untreated can spread to areas in proximity (including deeper structures)
- Can recur if not fully treated
- Most common in Caucasian and Eastern Asian patients
- Patients with history of BCC are at an increased risk of developing another BCC
- Usually develop in sun exposed areas
  - Face/ head/ neck

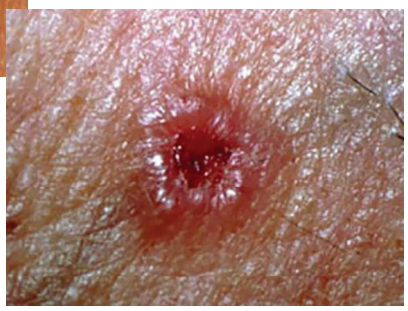


8

CHARACTERISTICS OF BASAL CELL CANCER

- Flat, firm, pale or yellow areas on the skin
- Small pink or red, translucent, shiny, pearly bumps which may have blue, brown or black areas
- Pink growths with raised edges and a depressed area in the center
- Non-healing wounds

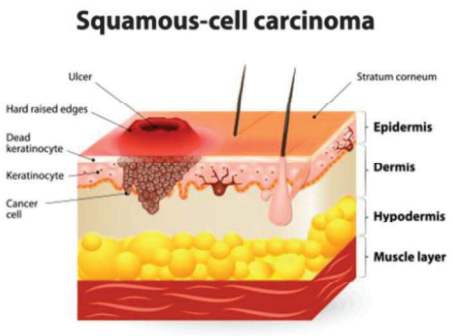




9

SQUAMOUS CELL CARCINOMA

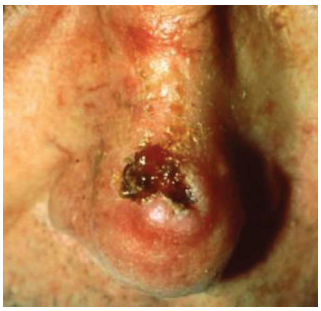
- Begin in the flat cells in the upper outer part of the epidermis
- Can begin as a precancerous skin lesion (AK)
- Less often they can develop from HPV
- Often occur in burns, scars, and post radiated skin
- More aggressive than BCC; have the potential to grow into deeper layers of the skin and metastasize
- Most common in Caucasian and Southern Asian patients
- Most common sites
  - Face/ ear/ lip/ neck/ dorsal hands

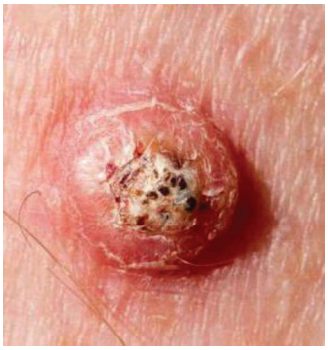


10

SQUAMOUS CELL CARCINOMA CHARACTERISTICS

- Rough or scaly red patches with potential to bleed or crust
- Wart-like growth
- Open sores with a raised border and crusty surface

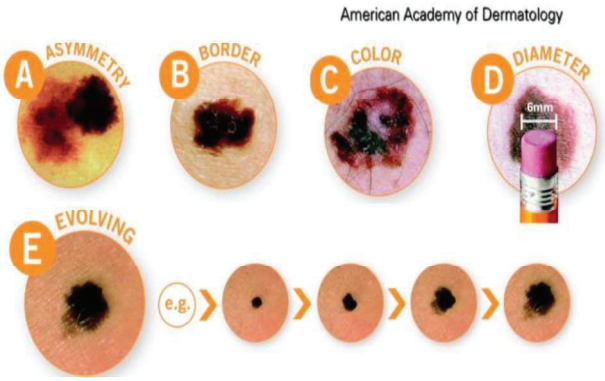




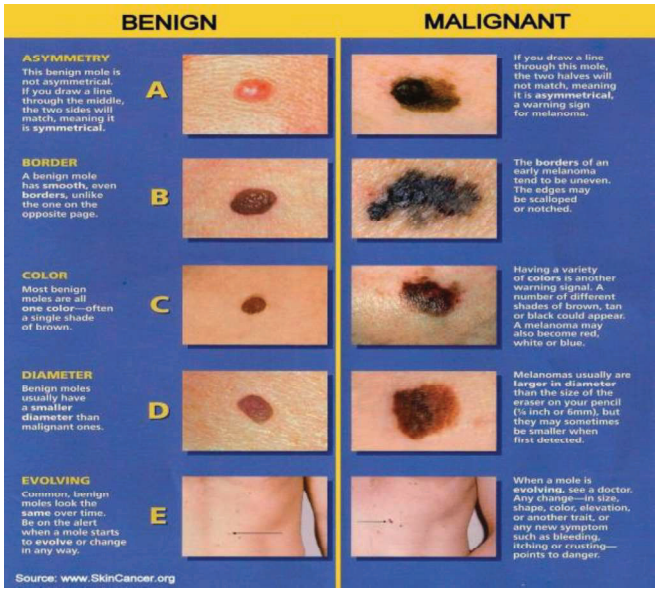
11

MELANOMA

- Begins in the melanocytes of the epidermis
  - MOST fatal because it is much more likely to metastasize to other parts of the body if it is not diagnosed early
- Most common site in men
  - Chest and back
- Most common site in women
  - Legs
- Can occur on the palms of your hands, soles of your feet and under your nails
  - More common in the African American population
- Melanoma can develop in a preexisting mole but nearly 70% occur in a new lesion
- Melanoma can develop in your eyes, mouth, genital and anal area
- Amelanocytic Melanoma- melanomas that cannot produce melanin and lack pigment
  - May appear red/ pink or nearly colorless



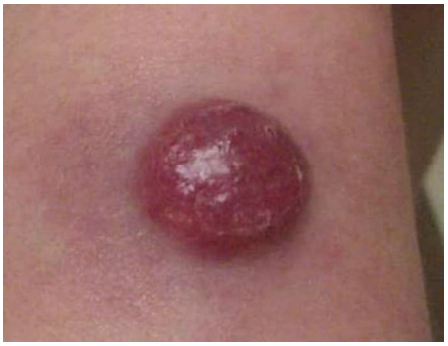
12



13

MERKEL CELL CANCER

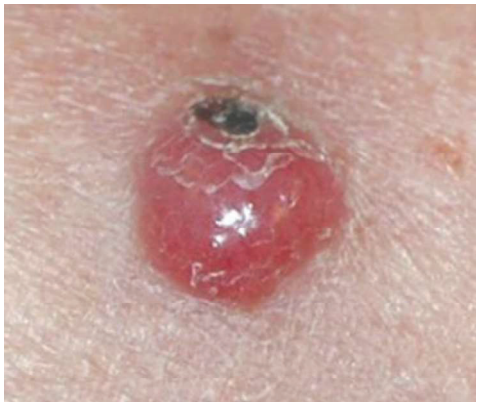
- RARE and potentially aggressive form of skin cancer if not diagnosed early
- Highly treatable and curable if diagnosed in early stages
- Type of skin neuroendocrine cell
  - Cells are very close to nerve endings and may also contain substances that act as hormones
- Found in the layer of basal cells at the deepest part of the epidermis
- Incidence increases with age



14

CHARACTERISTICS OF MERKEL CELL CANCER

- Reddish purplish bump mostly presents on sun exposed area of skin
  - Head/ neck/ arms/ legs
- Very small portion diagnosed inside of nose and esophagus
- Painless
- Fast growing and can open up as sores and ulcers



15

RISK FACTORS OF MERKEL CELL CANCER

- Overexposure of UV rays
- Male
- Light colored skin
- Psoriasis treatment
- Weakened immune system

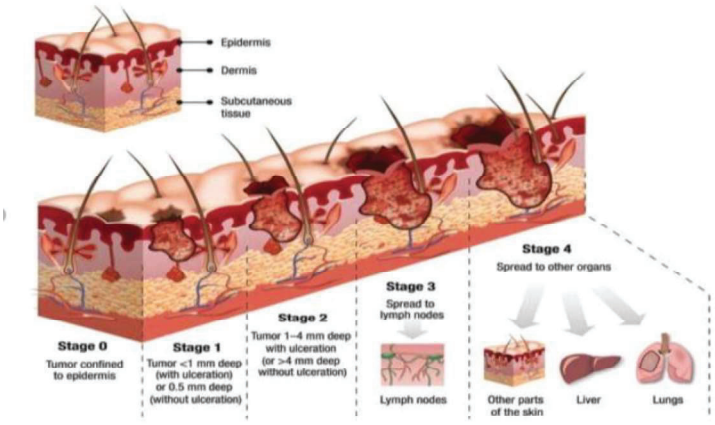
16

DIAGNOSTIC TESTING

- Dermoscopy/ TBSE
- Shave biopsy
  - Shave top layer of skin with a small surgical blade
- Punch biopsy
  - Instrument that looks like a tiny cookie cutter on the end
- Incisional biopsy
  - Surgical knife removes only a portion of the area of concern (not common)
- Excisional biopsy
  - Surgical knife removes he entire area of concern
- Fine needle aspirate (FNA)
  - Thin hollow needle used to obtain cells that can be examined by cytology
- Early detection greatly improves prognosis

17

STAGING



Skin cancer stages (source: teleskin.org)

18

TREATMENT (BCC/SCC)

Surgical options

- Excision- cutting out the tumor and margin of healthy skin
- Mohs surgery- microscopically removing layers of skin until all cancer is gone
- Curettage & Electrodesiccation (C&E)- scraping off the cancer with a curette and using cautery to destroy remaining cells and stop bleeding.

Non-surgical local treatments

- Topical medications- creams like imiquimod or efudex
- Cryosurgery- freezing the tumor with liquid nitrogen
- Photodynamic therapy- a drug activated by light to kill cancer cells
- Radiation therapy- used when surgery isn't ideal or for aggressive tumors, sometimes after surgery

TREATMENT (MELANOMA)

Early- stage

- Wide local excision- the main treatment, removing the melanoma and a margin of healthy skin
- Sentinel lymph node biopsy- can be done to check if cancer has spread to nearby lymph nodes
- Imiquimod cream- an immunotherapy cream used for very thin melanomas

Advanced/ Metastatic

- Immunotherapy- often first line, using checkpoint inhibitors (like pembrolizumab, nivolumab)
- Targeted therapy- drugs targeting specific genetic mutations in the BRAF gene (like Mektovi, Braftovi)
- Chemotherapy- can be given systemically or directly into a limb
- Radiation therapy
- Intralesional therapy- injecting treatment directly into the tumor (TVEC)

TREATMENT OF MERKEL CELL CANCER

Surgery- usually the first step, involving wide local excision of the tumor and a margin of healthy tissue, plus sentinel lymph node biopsy. If spread is noted, then lymph node dissection may occur.

Radiation therapy- often used after surgery

Immunotherapy- uses drugs to help the immune system fight cancer (avelumab, pembrolizumab, nivolumab)

Chemotherapy- may be used if immunotherapy isn't suitable or fails or for widespread disease.

REFERENCES

- https://www.aad.org
- http://www.cancer.gov
- http://www.cancer.org
- https://skincancer.org
- http://mayoclinic.org
- https://apollodermclinic.com/gardasil-vaccine-and-dermatology-the-unexpected-connection/#:~:text=This%20connection%20lies%20in%20the,developing%20SCC%20in%20some%20individuals.
- Lee YS, Gu H, Lee YH, Yang M, Kim H, Kwon O, Kim YH, Kang MY. Occupational Risk Factors for Skin Cancer: A Comprehensive Review. J Korean Med Sci. 2024 Nov 4;39(42):e316. doi: 10.3346/jkms.2024.39.e316. PMID: 39497567; PMCID: PMC11538571.

Allegheny
Health Network

Overview of Gynecologic Cancers

Quinn Ryan MPAS, PA-C
Gynecologic Oncology Department Physician Assistant
quinn.ryan@ahn.org

Allegheny General Hospital | Allegheny Valley Hospital | Canonsburg Hospital | Forbes Hospital | Jefferson Hospital | Saint Vincent Hospital | Westfield Hospital | West Penn Hospital

1

Objectives:

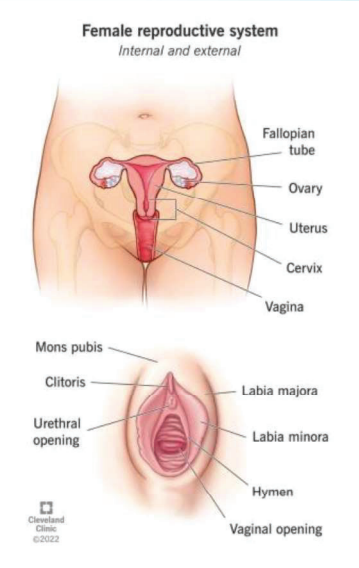
- Educate
  - Different gynecologic cancers
    - risk factors
    - histology
    - signs/symptoms
    - Treatment
- Prevention
- Genetics

Allegheny Health Network

2

Focus of Gynecologic Oncology

- Cancer types:
  - Ovarian, Fallopian Tube, & Primary Peritoneal
  - Uterine
  - Cervical
  - Vulvar
  - Vaginal



Gynecologic Cancers

- Approximately 84,000 new cases are diagnosed and about 28,000 deaths occur each year in US.
  - Uterine fourth highest incident cancer among women
  - Ovarian cancer is eighth most common diagnosed but fifth leading cause of death among US women.

National Library of Medicine (Journal of Women's Health) 2013

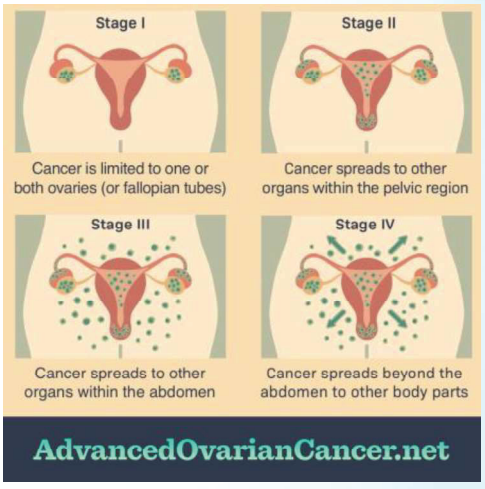
Ovarian Cancer

- Second most common gynecologic malignancy
- In the United States, there are approximately 19,880 new cases and 12,810 cancer-related deaths each year
- Average age of diagnosis in the U.S. is age 63
- Lifetime risk of developing ovarian cancer for general population is 1.3%
- More common in postmenopausal women
  - *Incidence increases with age*

Up To Date 2024- https://www.uptodate.com

Ovarian Cancer

- **Risk factors:**
  - Age (median age 63)
  - Early menarche or late menopause
  - Nulliparity
  - Genetic factors
  - Endometriosis (endometrioid, clear cell)
  - Cigarette smoking (mucinous carcinoma)
- **Protective factors:**
  - Bilateral salpingo-oophorectomy
  - Use of oral contraceptives
  - Tubal ligation
  - Hysterectomy
  - Breast feeding
  - Parity



Up To Date 2023- https://www.uptodate.com

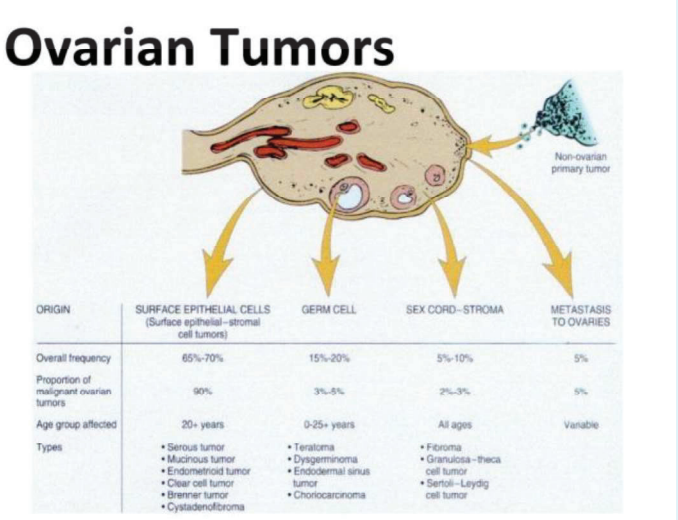
Ovarian Cancer

- **Genetics:**
- Incidence increases with family history and genetics:
  - BRCA mutations
    - Lifetime risks of ovarian cancer is 39-59% for BRCA1 and 11-20% for BRCA2 mutation carriers
    - Impact treatment and posttreatment care
      - PARP inhibitors
- All patients with a diagnosis of ovarian, fallopian tube, or peritoneal cancer should have a genetic risk evaluation:
  - Epithelial carcinoma of the ovary - testing for BRCA1 or BRCA2 mutations as well as other familial cancer syndromes (eg, Lynch syndrome)
  - Clear cell, endometrioid, or mucinous ovarian cancer- DNA mismatch repair deficiency.
- Multi-gene panel
  - *BRIP1, RAD51C*, or *RAD51D*
- Genetic Counseling Referral
  - Cascade testing
  - Risk reducing procedures

Ovarian Cancer

The majority of ovarian malignancies (95%) are derived from epithelial cells.

- Remainder arise from other ovarian cell types:
  - germ cell tumors and sex-cord stromal tumors.
- Histology Types: high-grade serous (70-80%) endometrioid (10 %), mucinous (3%), clear cell (10%), and low-grade serous (<5 %)
  - Borderline tumors or tumors of low malignant potential (14-15%)



Ovarian Cancer

Clinical presentation

- **Signs / Symptoms:**
  - Usually asymptomatic until late stage disease
    - Fatigue and malaise
    - Abdominal bloating and pain/ ascites
    - Early satiety
    - Nausea/ vomiting / bowel obstruction
    - Weight gain
    - Urinary urgency / frequency
    - Shortness of breath/ pleural effusion
    - In some cases a palpable abdominal mass can be felt on exam
    - Shortness of breath and pleural effusion
- **Diagnosis**
  - Ultrasound / CT TAP
  - Surgery confirms diagnosis
    - Exploratory laparotomy of the abdomen is preferred for full disease assessment and to obtain optimal tumor reduction
    - Ultrasound guided biopsy of ovarian mass is generally not performed
  - CA-125 level
    - useful as a baseline marker but doesn't confirm diagnosis

Ovarian Cancer

- **Treatment:**
  - Surgical Debulking – 1st line
    - TAH / BSO / Pelvic and Paraaortic Lymphadenectomy / Omentectomy
  - Adjuvant chemotherapy, platinum based regimen
  - Neoadjuvant chemotherapy followed by surgery
    - Reserved for patients not medically stable for surgery or advanced disease that is not amendable to upfront surgery.
- **Recurrent Disease:**
  - Secondary Surgery to remove large volume disease
  - Additional chemotherapy
    - Platinum based chemotherapy if platinum sensitive
    - Tumor profiling and target therapy
    - PARP inhibitor
    - Clinical trial
  - Palliative Therapy

Fallopian Tube & Primary Peritoneal Cancer

- Majority of high-grade serous carcinomas have been classified as ovarian cancers actually arise in the fallopian tube.
- Similar symptoms & signs as seen with ovarian cancer.
- Surgery and Chemotherapy are mainstay of treatment.

Endometrial Cancer

- Most common Gynecologic malignancy in developed countries
- 2.8 percent lifetime risk
- Mean age 62
- **Most common symptom is abnormal uterine bleeding/ postmenopausal bleeding**
- Usually present at an early stage
- Risk factors:
  - Unopposed estrogen
  - Anovulation
  - Obesity
  - Diabetes mellitus
  - Early menarche and late menopause
  - Family history- Lynch syndrome

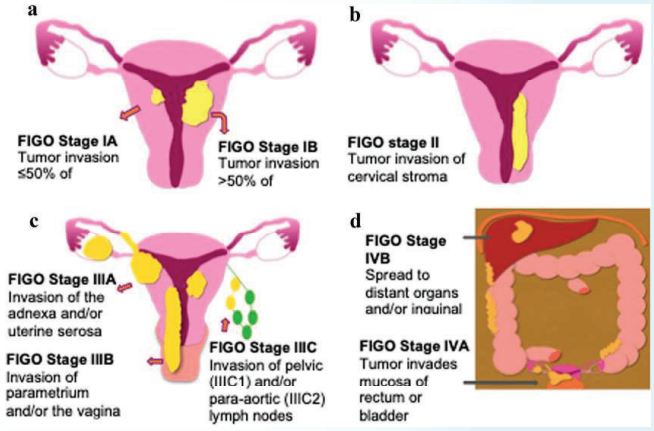
Lynch Syndrome

- Most common cause of inherited colon cancer.
  - hereditary nonpolyposis colorectal cancer (HNPCC)
- autosomal dominant disorder that is caused by a germline mutation in one of several DNA mismatch repair genes.
  - Accounts for approximately 3 percent of all colon cancer cases
  - About 2- 3 percent of endometrial cancers
  - Increased risk of several other malignancies including ovary, stomach, genitourinary, and more rarely small bowel, bile duct, pancreas, skin, and brain tumors.

Up To Date 2024- https://www.uptodate.com

Endometrial Cancer

- **Histology:**
  - Endometrioid most common 75-80% cases
  - Mucinous, Serous, Clear Cell, Carcinosarcoma
  - Rare: Neuroendocrine and Undifferentiated carcinomas



Endometrial Cancer

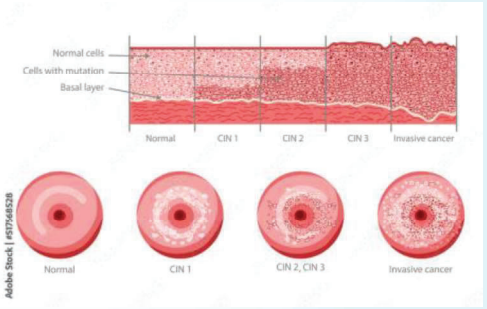
- **Classification:**
  - Type I are low grade neoplasms
    - FIGO grade 1-2 endometrioid
    - Endometrioid histology
    - Good Prognosis
  - Type II
    - 10-20 percent of endometrial carcinoma
    - FIGO grade 3 endometrioid
    - Nonendometrioid (serous, clear cell, mixed cell, and undifferentiated

Endometrial Cancer

- **Treatment:**
  - Staged surgically
  - Total hysterectomy (TLH or TAH), bilateral salpingo-oophorectomy
    - Sentinel Lymph node Mapping
    - Pelvic and paraaortic lymph node sampling for grade 2 or 3 disease
  - Postoperative radiation
    - Patients at high risk of recurrence
    - Therapy for Uterine Sarcomas
      - TAH/BSO and surgical staging
      - Postoperative pelvic radiation therapy for local control
      - Chemotherapy

Cervical Cancer

- Third most common gynecologic cancer and cause of death among gynecologic cancers in the U.S.
  - In the United States, approximately 14,100 new cases of invasive cervical cancer and 4,280 cancer-related deaths occur each year
- Developing countries without routine cervical cancer screening and prevention programs:
  - second most common type of cancer and third most common cause of cancer deaths among all types of cancer in women.
- Pap Test and yearly pelvic exam is the best screening
- Average age 50
- Age distribution:
  - Under 20 : 0.1 per 100,000
  - 20-34: 1.3 per 100,000
  - 35-54 : 2.2-2.3 per 100,000



Cervical Cancer

- **Histologic types:**
  - Adenocarcinoma (25%) , squamous cell carcinoma (70-75 %), other (rare)
- **Risk Factors:**
  - HPV related:
    - Early onset sexual activity
    - Multiple sexual partners
    - History of vulvar or vaginal squamous intraepithelial neoplasia or cancer
    - Immunosuppression
  - Non HPV related:
    - Cigarette smoking
    - Lower socioeconomic status
    - Nonwhite race
    - Missed gynecologic care
    - More than 3 years since last pap

Cervical Cancer

- **Symptoms:**
  - Early cervical cancer frequently asymptomatic
  - Irregular or heavy vaginal bleeding
  - Post coital bleeding
  - Foul smelling vaginal discharge
  - If advanced disease: pelvic or back pain, leg swelling, bowel or urinary symptoms
- **Signs:**
  - Friable cervix, may be grossly enlarged and irregular
  - Ulcerative lesions
  - Cervix can be enlarged and firm but normal surface
  - Parametrial disease on exam

Cervical Cancer

- **Treatment:**
  - Chemotherapy and Radiation Therapy
    - Platinum based chemotherapy agent, most common Cisplatin
    - External Beam and Internal (Brachytherapy)
  - Hysterectomy
    - Simple for early stage disease with minimal invasion </= 3mm.
    - Radical with pelvic lymph node dissection – if depth of invasion >3 mm.
  - Surgical Pelvic Exenteration
    - Locally recurrent disease following prior treatment with radiation and chemotherapy.

Cervical Cancer

- **Human Papilloma Virus (HPV):**
  - HPV can be detected in 99.7 percent of cervical cancers.
  - HPV is a sexually transmitted infection that causes genital and oropharyngeal disease in males and females.
  - Among the more than 40 genital mucosal HPV types identified, approximately 15 are known to be oncogenic

Cervical Cancer

- **High-risk HPV genotypes**
  - *16 and 18 cause approximately 70% all cervical cancers worldwide.*
    - HPV 16 – 50 percent of cases
    - HPV 18 – 20 percent of cases
  - 16 and 18 also causes 90% anal cancers and linked to oropharyngeal cancer, vulvar and vaginal cancers.
  - 6 and 11 cause 90% of anogenital warts
  - Types 31, 33, 35, 39, 45, 51, 52, 56, 58, 59 , 68, 69 and82 are other types linked to causing cancer

Cervical Cancer

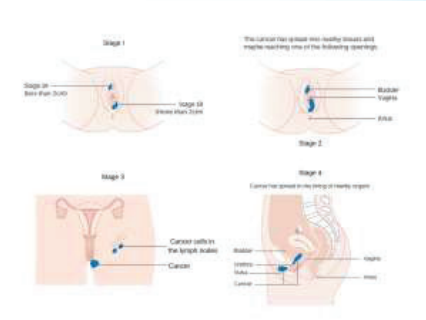
- **Prevention:**
  - HPV Vaccines:
    - Quadrivalent HPV vaccine (Gardasil) targets the HPV types 6, 11, 16, and 18
    - 9- valent vaccine (Gardasil 9) targets the same HPV types as the quadrivalent vaccine (6, 11, 16 and 18) as well as types 31, 33, 45, 52, and 58
    - Bivalent vaccine (Cervarix) targets HPV types 16 and 18
  - In the United States, only the 9-valent vaccine is available

Cervical Cancer

- **Gardasil Vaccine Administration**
  - *vaccination is recommended at 11 to 12 years.* It can be administered starting at 9 years of age.
  - adolescents and adults aged 13 to 26 years not previously vaccinated or who have not completed the vaccine series, additional vaccination is recommended.
  - In the United States, the HPV vaccine is now approved through age 45

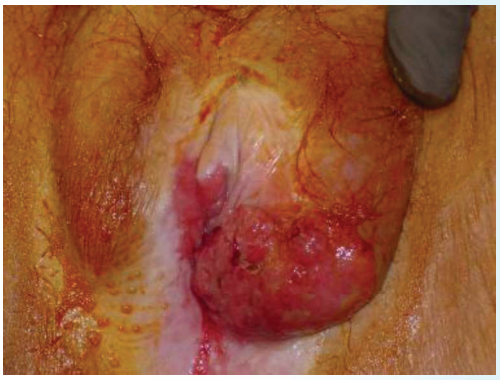
Vulvar Cancer

- 3-5 percent of Gynecologic Cancers
- 0.3 percent lifetime risk
- Average age is 68 years
- Squamous cell carcinoma most common histology
  - Other histologies include: melanoma, basal cell carcinoma, Bartholin gland carcinoma, sarcoma, and Paget disease
- Risk Factors:
  - 90% associated with HPV
  - Age
  - Chronic vulvar irritation/ lichen sclerosus
  - Prior history of cervical cancer
  - Cigarette smoking
  - Immunodeficiency syndromes



Vulvar Cancer

- **Symptoms:**
  - Vulvar Pruritus and pain
  - Non-healing ulcer
  - Vulvar mass
  - Common site is labia majora
- **Diagnosis:** BIOPSY
- **Treatment:**
  - Wide Local Excision
  - Radical Vulvectomy
    - Can include ipsilateral or bilateral lymphadenectomy
  - Preoperative chemotherapy / radiation for extensive lesions



Vaginal Cancer

- Least common of the gynecologic cancers
- More common to have cancer metastasize to the vagina
- Mean age 62
- **Risk Factors:**
  - HPV
  - Chronic irritation
    - Previous radiation for cervical cancer
- **Symptoms / Signs:** similar to cervical cancer
- **Diagnosis:** BIOPSY
  - Disease is staged clinically

Vaginal Cancer

- **Treatment**
  - Surgical resection
  - Radiation therapy
  - Chemotherapy

Summary

- CA125 elevated in patients with ovarian cancer
- 90% of ovarian tumor are derived from epithelial cells
- Abnormal uterine bleeding is the most common symptoms of endometrial cancer
- HPV 16 & 18 are responsible for 70 % of cervical cancers
- Gardisil vaccination is recommended at age 11 to 12
- Vulvar/ Vaginal cancers are rare. Biopsy for diagnosis

Questions??

- Thank You

References

1) Up To Date 2023 https://www.uptodate.com
3) Ritu, Salani, Khanna, N, Frimer, M, Bristow R. An Update on post-treatment surveillance and diagnosis of recurrence in women with gynecologic malignancies: Society of Gynecologic Oncologists Recommendations.
4) American Cancer Society. https://www.cancer.org
5) National Comprehensive Cancer Network. https://www.nccn.org
6) National Institute of Health- Clinical Center. www.cc.nih.gov.

Fundamentals of Oncology Day 2 Evaluation

Allegheny Health Network
Pittsburgh, Pennsylvania

Fundamentals of Oncology Course Post-Assessment- Day 2
Version 1- (2026)

The purpose of this assessment is to verify minimal comprehension of basic oncology concepts and care of the patient with cancer by clinicians caring for oncology patients.

This assessment consists of 8 pages with 30 questions worth 30 points. Please check your booklet to make sure you have the correct number of pages in the proper sequence.

Multiple Choice
The following items are multiple choice. There is only one correct answer for each question. Please select and circle the correct answer. (1 point each)

1. What is the most common site of metastases in squamous cell esophageal cancer?
    a. Liver
    b. Peritoneum
    c. Lung
    d. Distant lymph nodes

2. Which genetic diagnosis is associated with gastrointestinal cancers?
    a. HBOC
    b. Lynch Syndrome
    c. Li-Fraumeni
    d. Peutz-Jeghers

3. This tumor type accounts for 90-95% of gastric cancer:
    a. neuroendocrine.
    b. squamous cell.
    c. adenocarcinoma.
    d. gastrointestinal stromal tumors (GIST).

4. What is the most common presenting symptom of pancreatic cancer?

   a. Increased appetite
   b. Ascites
   c. Pain
   d. Dark stools

5. The most common type of malignant brain tumors arises from:

   a. neurons.
   b. astrocytes.
   c. oligodendrocytes.
   d. lymphatic tissues in the brain.

6. The first and typically best option in the treatment of brain tumors is:

   a. VP shunt placement.
   b. radiation.
   c. clinical trials.
   d. surgery.

7. An aggressive type of thyroid cancer in which mortality approaches 100% is known as:

   a. follicular.
   b. medullary.
   c. anaplastic.
   d. papillary.

8. Which of the following is a causative factor to the development of head and neck cancer?

   a. CMV
   b. HPV (p16)
   c. EBV
   d. HTLV(1)

9. The type of tumor arising from the Mesenchymal cell is known as:

   a. small cell lung cancer.
   b. melanoma.
   c. sarcoma.
   d. signet ring colon cancer.

10. The most common sign and symptom of breast cancer is:

   a. skin dimpling (sometimes looking like an orange peel).
   b. nipple retraction.
   c. nipple or breast skin that is red, dry, flaking or thickened.
   d. new lump or mass.

11. At what age does the American Cancer Society (ACS) recommend women at average risk have the option for annual mammography?

   a. 35
   b. 40
   c. 45
   d. 50

12. Which of the following is the most common type of breast cancer?

   a. Infiltrating ductal carcinoma
   b. Invasive lobular carcinoma
   c. Ductal carcinoma in situ
   d. Invasive tubular carcinoma

13. What percentage of the patients initially diagnosed with breast cancer have metastatic disease?

    a. 6%

    b. 5%

    c. 15%

    d. 21%

14. When considering treatment options for patients with the diagnosis of small-cell lung cancer (SCLC), the clinician understands that SCLC:

    a. grows slowly.

    b. responds well to surgical resection.

    c. divides rapidly.

    d. remains localized.

15. Low dose CT screening is recommended for which of the following?

    a. Those who currently smoke, and/or recently quit

    b. Patients older than 80

    c. Those exposed to secondhand smoke

    d. Patients younger the 30

16. Which of the following is an example of how non-small cell lung cancer (NSCLCA) differs from small cell lung cancer (SCLCA)? Non-small cell lung cancer patients:

    a. present with a typically less aggressive disease.

    b. respond poorly to anticancer therapies.

    c. progress with a very aggressive course of disease progression.

    d. develop metabolic oncologic emergencies.

17. Tumor markers in lung cancers are predominately used to:

    a. diagnose disease.
    b. make treatment decisions.
    c. stage the tumor.
    d. identify cell histology.

18. Prostate cancer symptoms of bone pain, anemia, weakness, and flank pain are indicative of what stage of disease?

    a. Early stage
    b. Advanced
    c. End-stage renal
    d. Non-invasive

19. Cryptorchidism puts a child at risk for which of the following cancers?

    a. Leukemia
    b. Sarcoma
    c. Wilms tumor
    d. Testicular

20. The most common sign/symptom of testicular cancer is:

    a. lump and/or swelling.
    b. anemia.
    c. weight loss.
    d. spinal cord compression.

21. A modifiable risk factor associated with increased risk of bladder and kidney cancers is:

    a. diet high in red meats.
    b. age.
    c. smoking.
    d. gender.

22. Which of the following does the kidney produce that is responsible for the regulation of red blood cell production?

    a. Renin
    b. Testosterone
    c. Erythropoietin
    d. Follicle stimulating hormone

23. The most common presenting symptom of endometrial cancer is:

    a. acute abdominal pain.
    b. increased abdominal girth.
    c. abnormal vaginal bleeding.
    d. milky vaginal discharge.

24. Which of the following tumor markers would you expect to be elevated in 80% of clients with advanced ovarian cancer?

    a. CA 125
    b. CA 15
    c. CA 19-9
    d. CA 27-29

25. Most ovarian tumors (90%) are derived from what type of cells?

    a. Endometroid cells
    b. Epithelial cells
    c. Germ cells
    d. Clear cells

26. What high-risk HPV genotypes cause approximately 70% of all cervical cancers?

    a. 31 and 33
    b. 16, 45, 52, 58
    c. 16 and 18
    d. 6 and 11

27. At what age is it recommended to start the Gardasil vaccination?

    a. 12 to 14
    b. 13 to 26
    c. 11 to 12
    d. 9 to 18

28. Skin self-exam may lead to early detection of skin cancer by recognizing:

    a. normal skin moles, keratosis, warts.
    b. seborrheic keratosis.
    c. skin tags.
    d. changes in appearance, surface, diameter, elevation of a mole.

29. When teaching about the prevention of skin cancer, the major areas to be included initially are:

a. length of exposure, sunscreen (SPF 15 or >), protective clothing, and sunglasses.

b. time of day and year sun exposure, and recreational activities.

c. skin type, genetic history and family pedigree.

d. skin assessment, effect of altitude during skin exposure, time of year and day.

30. Which skin cancer is a type of neuroendocrine cell?

a. Squamous cell

b. Basal cell

c. Merkel cell

d. Melanoma