

Unit 6

Problems of Mobility, Sensation, and Cognition
Bone Cancer
LeMone Ch. 40-42

Objectives

- ▶ Review the anatomy and physiology of the musculoskeletal system.
- ▶ Outline a focused physical exam of the musculoskeletal system.
- ▶ Differentiate and start to evaluate diagnostic exams used to assess problems of the musculoskeletal system.
- ▶ Apply nursing interventions before and after diagnostic exams utilized for the musculoskeletal system.
- ▶ Identify diversity concerns for patients at risk for bone cancer.
- ▶ Detect complications associated with the bone cancer.
- ▶ Relate the clinical manifestations of bone cancer, identifying diagnostic data related to both of these disease processes.
- ▶ Design a nutritional plan for patients with bone cancer.

More Objectives

- ▶ Summarize pharmacological agents used in bone cancer.
- ▶ Apply critical thinking skills and analyze nursing interventions when providing pain medications to clients with bone cancer.
- ▶ Analyze surgical and non surgical interventions for bone cancer.
- ▶ Relate etiology, epidemiology, pathophysiology, clinical manifestations, nursing diagnoses, implementation/interventions, and medical-surgical management indicated for patients with bone cancer.
- ▶ Point out important information needed when communicating to the physician or nurse regarding the client with bone cancer
- ▶ Select nursing interventions that will prevent bone cancer as well as complications.
- ▶ Identify teaching principals and needs of the adult and geriatric client, as a participant in the care, with bone cancer.

Focus for today

- ▶ Today we are going to focus on Bone Cancer
- ▶ Some basics to start our thought process:
 - Cancer that originates in the bone — primary bone cancer — is rare.
 - Fewer than 2,500 Americans are diagnosed with this type of cancer each year.
 - The condition affects more children than adults.

The Skeleton

- ▶ Composed of bones of the skeletal system
- ▶ Ligaments
- ▶ Tendons
- ▶ Muscles of the muscular system
- ▶ Joints

A & P of musculoskeletal system

- ▶ Skeletal system consists of:
 - 206 Bones
 - Multiple Joints

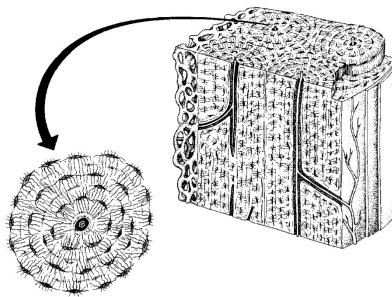


The Skeleton

Physiology

- ▶ Bone cells
- ▶ Bone matrix
- ▶ Periosteum
- ▶ Compact bone
- ▶ Spongy bone

The Skeleton



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OSTEONS, X.S. AND LONGITUDINAL SECTION
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The Skeleton

Bone Remodeling

- ▶ Occurs throughout life
- ▶ Use and stress increase osteoblastic activity
- ▶ Inactivity increases osteoclast activity
- ▶ Hormonal stimulus
- ▶ Also regulated by response to gravitational pull/mechanical stress

Bones and Joints –effect of Aging

- ▶ Decrease in bone mass and mineralization
- ▶ Calcium reabsorption
- ▶ Vertebral shortening
- ▶ Intervertebral disk thinning
- ▶ Joint cartilage deterioration

Blood Tests

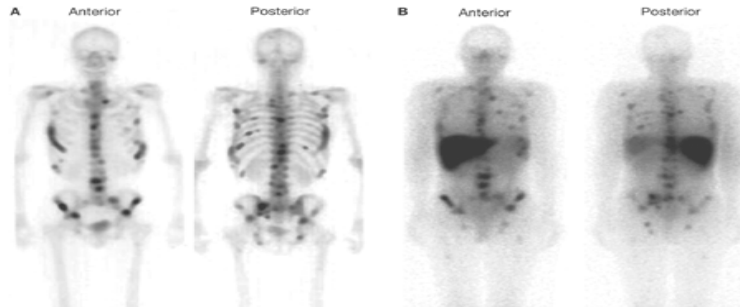
- ▶ Alkaline phosphatase
- ▶ Calcium
- ▶ Uric acid
- ▶ Phosphorous (P) and Phosphate (PO₄)
- ▶ Creatine kinase

Radiologic Examinations

- ▶ X-rays
- ▶ CT scans
- ▶ MRIs
- ▶ Bone scans
- ▶ Needle Biopsies

- ▶ Pg 1387

Bone scan



- ▶ Two patients with positive bone scans. The tests utilized a radioactive material as a means of detecting tumors, arthritis, osteomyelitis and several other tests.
Note the densities where the radioisotope collected at “hot spots”

Symptoms

- ▶ Pain is the most common bone cancer symptom. Although bone cancer can arise in any of your bones, it most frequently occurs in the long bones of your arms and legs.
- ▶ Other possible symptoms and signs of bone cancer include:
 - Weakened bones, sometimes leading to fractures
 - Joint swelling and tenderness (for tumors in or near joints)
 - Fatigue
 - Fever
 - Unintended weight loss
 - Anemia

Focused physical assessment

- ▶ **Assess:**
 - a. Observe the patient's posture and gait.
 - b. Palpate the skin for indication of tenderness, swelling, or increased temperature.
 - c. Observe for discoloration.
 - d. Examine the joints, observing for size, shape, alignment, and range of motion.
 - e. Examine the muscles for strength, movement, and indications of atrophy or contracture.
 - f. Assess vascular function by "blanching" fingers and toes. Check pulses.
 - g. Assess neurological function by checking reflexes, sensation, and motor ability.
 - h. Ask whether the client has had previous radiation therapy for cancer and elicit information about the client's general health.

Grading and Staging

- ▶ Grade
- ▶ Stage
- ▶ Localized
- ▶ Metastasized

Musculoskeletal system

- ▶ Nursing interventions to evaluate before and after diagnostic exams (ie metal for MRI and increasing fluids after bone scan)

Bone Tumors

- ▶ Benign (noncancerous) bone tumors are often asymptomatic and may be discovered on routine x-ray examination or as the cause of pathologic fractures
- ▶ The cause of benign bone tumors is not known
- ▶ Tumors may arise from several types of tissues and this leads to the classification

Benign Tumor Classifications

- ▶ Chondrogenic
 - From Cartilage
- ▶ Osteogenic
 - From bone
- ▶ Fibrogenic
 - From fibrous tissue
 - Found most often in children

Chondrogenic Tumors

- ▶ Osteochondroma
 - The most common benign bone tumor (40%)
 - Onset is usually in childhood
 - Although it can occur in any bone, the femur and tibia are most often involved
 - About 10% turn into sarcomas
- ▶ Chondroma
 - Lesion of mature hyaline cartilage
 - Although it can occur in any bone, they affect primarily the hands and feet, ribs, sternum and spine

Osteogenic Tumors

- ▶ Osteoid Osteoma
 - Distinguished by pinkish, granular appearance resulting from the proliferation of osteoblasts
 - Can affect any bone but femur and tibia are most often involved.
- ▶ Osteoblastoma
 - Often called "*giant osteoid osteoma*"
- ▶ Giant Cell Tumor
 - Characterized by an aggressive and extensive lesion

Malignant Bone Tumors

- ▶ Primary
 - Occur most often in people between 10–30yrs of age
- ▶ Secondary
 - Originate in other tissues and metastasize to bone
 - Metastatic lesions most often occur in the older age group and account for most bone cancers.

The exact cause of bone cancer is unknown

Nursing Diagnosis/Interventions

- ▶ Risk for Injury
- ▶ Acute Pain
- ▶ Impaired Physical Mobility
- ▶ Decisional Conflict

Primary Tumors

- ▶ Osteosarcoma
 - Most common type of primary malignant bone tumor
 - Ewing's Sarcoma
 - Most malignant of all tumors
- ▶ Chondrosarcoma
 - Arises from cartilaginous tissue, the lesion destroys bone and often calcifies
- ▶ Fibrosarcoma
 - Arises from fibrous tissue.

Metastatic Bone Disease

- ▶ Primary tumors of the prostate, kidney, thyroid, and lung are considered Bone-Seeking cancers; they metastasize to the bone more often than other primary tumors.
- ▶ The vertebrae, pelvis, femur and ribs are the bone sites commonly affected.

Complications with Bone Cancer

- ▶ Pain/ swelling
- ▶ The complications of bone cancer may include weakened bones and bone fractures. If the cancer spreads to other organs, complications include dysfunction of the affected organ, such as shortness of breath if it spreads to your lungs.

TREATMENT

- ▶ The physician may use drug therapy, and surgery in combination when possible.
 - Chemotherapy
 - Radiation
 - Surgery

Treatment–Chemotherapy

- ▶ Depending on the type of cancer you have and whether it has spread, the doctor may use chemotherapy to:
 - Shrink the cancer prior to an operation, making the operation easier
 - Eliminate all cancer cells in your body, even when cancer is widespread
 - Prolong the patients life by controlling cancer growth and spread
 - Relieve symptoms and enhance your quality of life
 - In some cases, chemotherapy may be the only treatment you need. More often, doctors use it in conjunction with other treatments, such as surgery or radiation, to improve results.

Treatment– Surgery

As with other cancers, bone cancer treatment depends on the size, type, location and stage of the cancer, including whether it has spread to the lungs or other parts of your body, and your overall health.

▶ Surgery

- Surgery is the most common treatment for bone cancer. Surgery for cancer that hasn't spread involves removing the cancer and a rim of healthy bone surrounding it.

In the past, amputation was common for bone cancer in an arm or leg.

Today, advances in surgical techniques and chemotherapy before surgery (neoadjuvant chemotherapy) or after surgery (adjuvant chemotherapy) and radiation therapy make limb-sparing surgery possible in many cases.

Information to inform the physician

- ▶ IN addition to what you find during your assessment, it is important to inform the physician:
 - Effect of treatment
 - Any adverse drug effects
 - Toleration of pain
 - Somnolence from too much meds or not enough
 - Anytime the patient or family has questions
 - Pt and family education is the key to assisting our patients. The more they know, the less the fear.