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A BRIEF REVIEW OF OSTEOSARCOMA IN HUMANBING

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Abstract:

Bone cancer occurs when a tumor, or atypical mass of tissue, forms in a bone. These are called bone sarcomas.A tumor may be malignant, which means it's growing aggressively and spreading to other parts of the body. A malignant tumor is often referred to as cancerous. Bone cancer can begin in any bone in your body, but it most commonly starts in the pelvic bone or the long bones in your legs or arms, such as your shinbone, femur, or upper arm. Bone cancer is when cancer cells grow out of control in your bone. This can damage normal bone tissue. Metastasis may start in your bone or spread from other parts of your body.Bone cancer is not common. Most bone tumours are benign. They are not cancerous and do not spread to other body parts. However, they may still weaken your bones and lead to broken bones or other problems.Primary bone cancers are cancers that form in the bone itself. However, many tumours that begin in organs or other parts of the body can also spread to the bones. These growths are called secondary or metastatic bone cancers. They are caused by cancer cells spreading from the original tumour to other parts of the body. Treatment includes surgery and chemotherapy, depending on the type of cancer.

Key words:Sarcoma,Malignant, Bone, cancer,tumor

Description: The cause of bone cancer isn't exactly known, but there are certain factors that may contribute to or increase a person's chances of forming atypical growths in the bone. These include:Healthy cells continually divide and replace older cells. After completing this process, they die. However, atypical cells continue living. They start forming masses of tissue that turn into tumors.

Primary bone cancers: The most common types of primary bone cancers include Osteosarcoma, Chondrosarcoma, and Ewing's sarcoma. Osteosarcoma develops in new tissue of growing bones and occurs most commonly in children or adolescents. Chondrosarcoma originates in cartilage, which is a type of connective tissue that serves as a protective layer between bones ends. Ewing 's sarcoma originates in immature nerve tissue within bone marrow. This type of bone cancer also occurs more frequently in children and adolescents. Less common bone cancers include malignant fibrous histocytoma and fibrosarcoma. These cancers are similar to Osteosarcoma in that they occur mainly in the extremities, except they occur in adults.

Cancers Metastatic to Bone or (Secondary bone cancers): Although most cancers can spread to or invade bone, the most common cancers that spread to bone are multiple myeloma, breast, prostate, lung, kidney, and thyroid cancer. The ribs, pelvis and spine are normally the first bones impacted by bone metastases, while bones more distant from the central skeleton are less frequently affected. It is not well understood why certain cancers metastasize to bone more than others. However, some general observations about bone metastases are as follows:

Breast cancer is the most common type of cancer to spread to bone, followed by prostate, then lung.

Carcinomas, or cancers that arise from tissues that line or cover organs, are much more likely to metastasize to bone than sarcomas, cancers that originate in connective tissue (cartilage, fat, or muscle).

Bone metastases from kidney cancer may occur many years after the primary cancer has been treated.

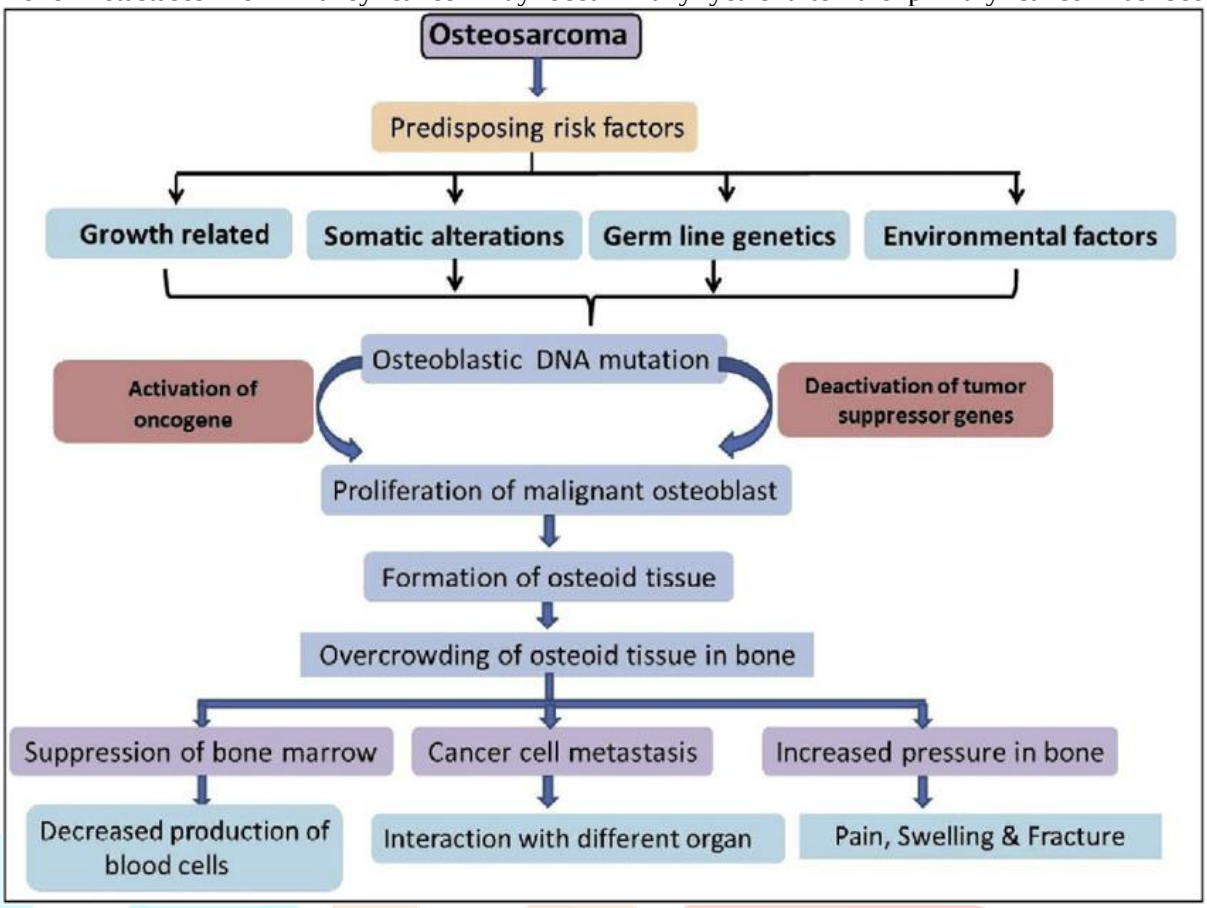

Fig-1 osteosarcoma

Bone cancer can begin in any bone in your body, but it most commonly starts in the pelvic bone or the long bones in your legs or arms, such as your shinbone, femur, or upper arm.

Cancer that begins in the bones is uncommon. However, it can be aggressive, so early detection is important.

Cancer may also begin in another area of the body and spread to the bone. Cancer is usually named for the location where it starts.

Types of bone cancer

Primary bone cancers are the most serious of all bone cancers. They form directly in the bones or surrounding tissue, such as cartilage.

Cancer can also spread, or metastasize, from another part of your body to your bones. This is known as secondary bone cancer, and this type is more common than primary bone cancer.

Common types of primary bone cancers include:

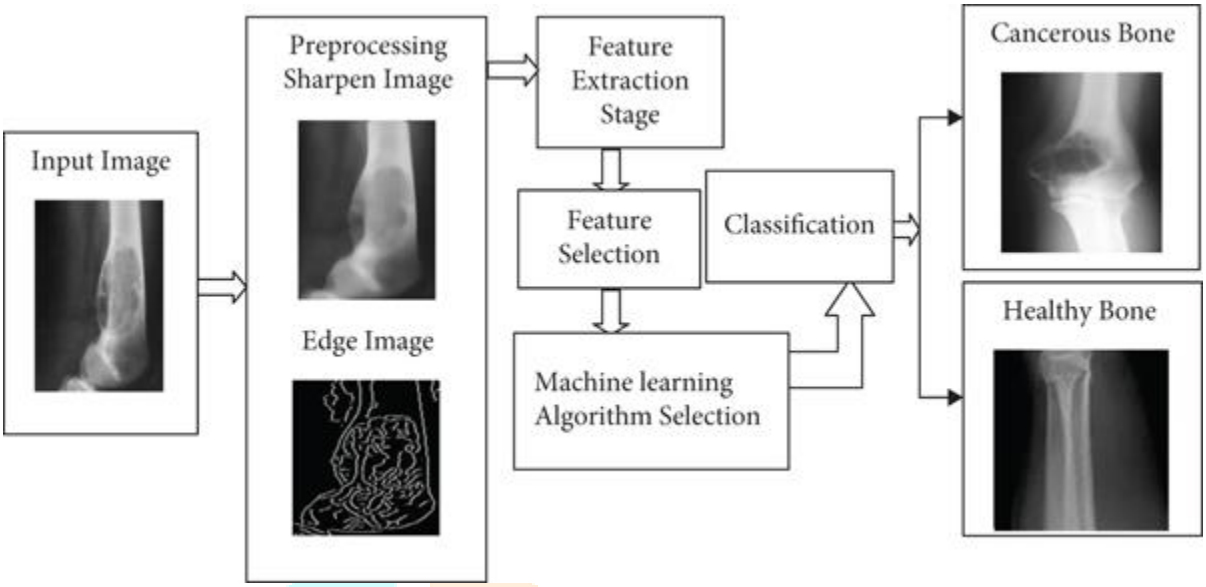

Fig-2

Osteosarcoma (osteogenic sarcoma)

Share on Pint **Osteosarcoma** or osteogenic sarcoma, generally affects children and adolescents, but it can also occur in adults. It has a tendency to originate at the tips of the long bones in the arms and legs.

Osteosarcoma may also start in the hips, shoulders, or other locations. It affects the hard tissue that provides the outer layer of your bones.

Osteosarcoma is the most common type of primary bone cancer.

Ewing's sarcoma

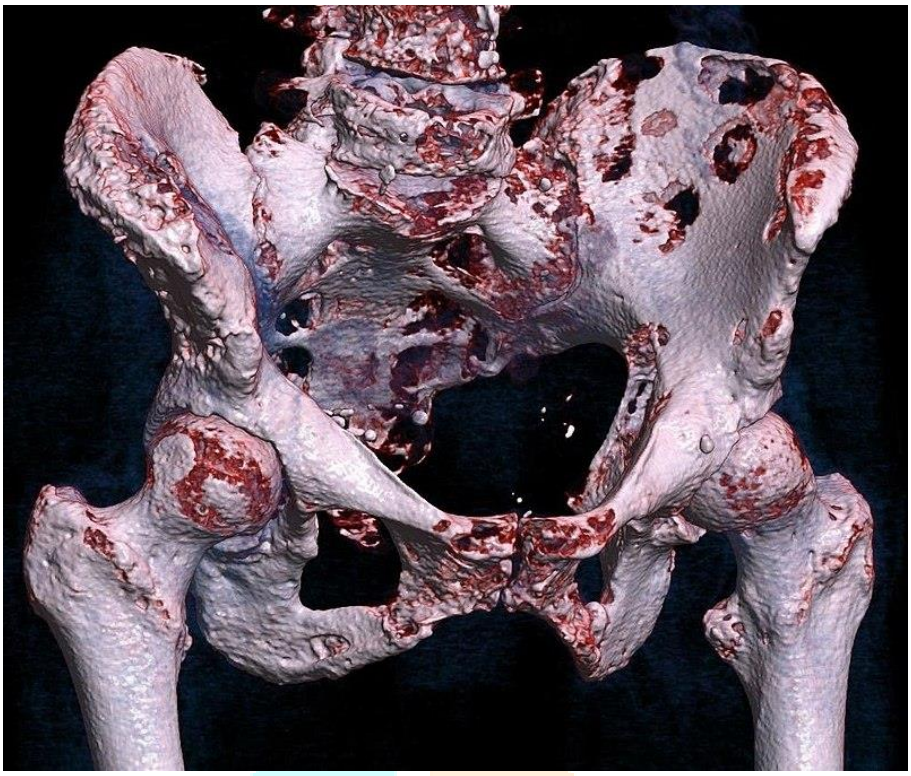

Fig-3 Chondrosarcoma

Ewing's sarcoma is the second most common type of primary bone cancer. It either begins in the soft tissues surrounding the bones or directly in the bones, and it often affects children and young adults.

The long bones of your body — such as your arms and legs — and the pelvis are commonly affected.

Chondrosarcoma

Chondrosarcoma most commonly begins in the bones of the pelvis, thigh areas, and shoulders of older adults.

It forms in the subchondral tissue, which is the tough connective tissue between your bones..

Multiple myeloma

The cause of bone cancer isn't exactly known, but there are certain factors that may contribute to or increase a person's chances of forming atypical growths in the bone. These include:

Fig-4 Skull and ribs bone cancer

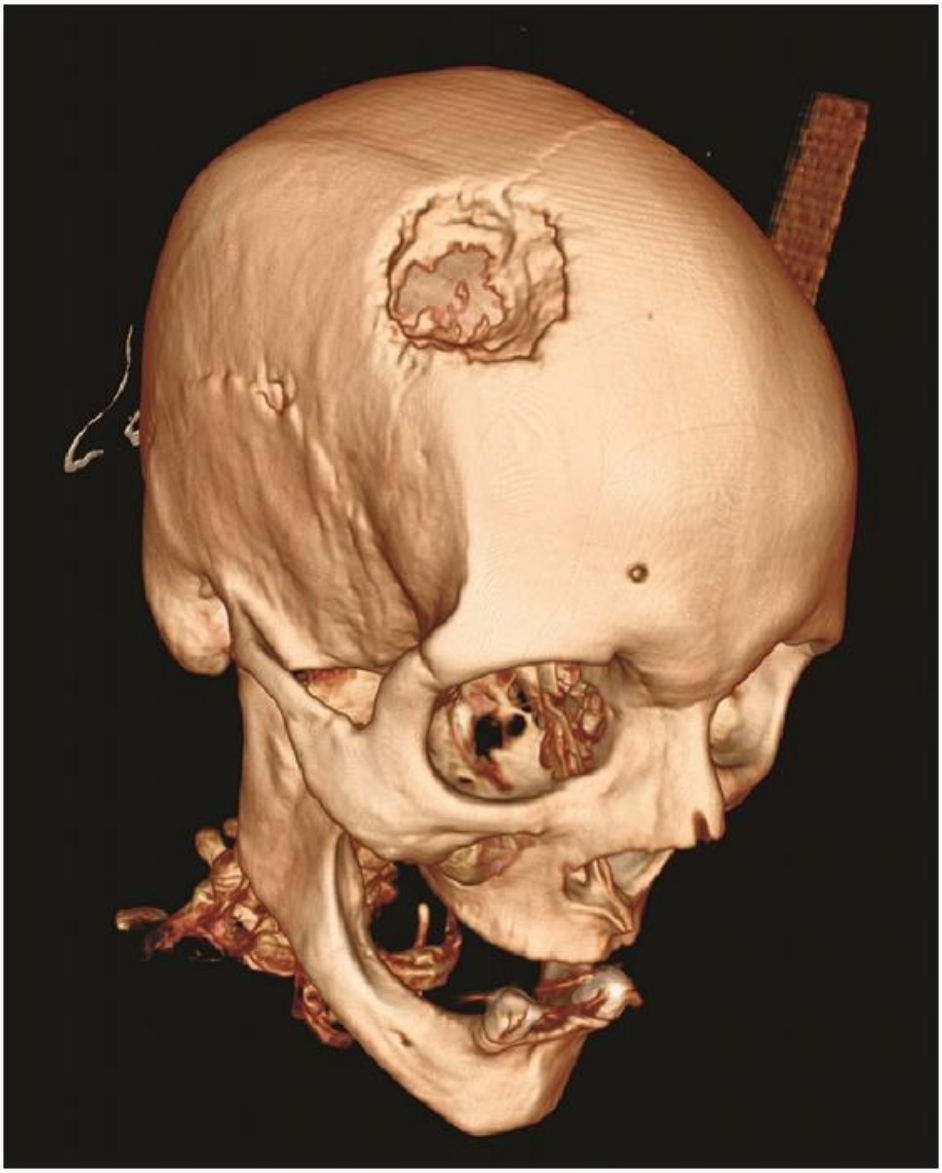

Fig-5 Skull osteosarcoma

Common Types Of Benign Bone Tumours:

- **Osteochondroma** As the skeleton develops, this particular sort of tumour, which is composed of both cartilage and bone, might get larger. These tumours develop away from the bone.
- **Giant cell tumours** are usually located in the leg. However, there are rare cases in which these can also be cancerous.
- **Osteoid osteoma** is a common type of bone tumour in young adults, usually occurring in the early 20s.
- **Osteoblastoma** is a rare tumour that primarily affects the spine and long bones.
- The most common place where **enchondromas** (enlargements of the cartilage) are found is in the bones of the hands and feet. It often has no symptoms.

The symptoms of bone cancer can include:

- pain and swelling in the affected bones
- a palpable hard mass in the long bones of your limbs, pelvis, or chest
- feeling tired or fatigued
- pain in your bones that wakes you up at night
- bone pain that can start after minor trauma
- decreased range of motion

Less common symptoms can include:

- easily broken bones
- weight loss
- fever

While pain is the most common symptom of bone cancer, not all types of bone cancer cause pain.

Radiation therapy

Radiation therapy, which kills dangerous cancer cells, can be used to treat bone cancer.

Chromosomal mutations

For osteosarcoma in particular, 70% of cases demonstrated some atypical characteristics in the chromosomes.Genetic mutations that raise the risk of developing bone cancer may be inherited, though this is rare. Mutations can also happen as the result of radiation or seem to have no specific cause.

The following may be risk factors for bone cancer:

- having a family history of cancer, especially bone cancer
- having received radiation treatment or therapy in the past
- having Paget's disease, which is a condition that causes the bones to break down and then grow back atypically
- currently or previously having had multiple tumors in your cartilage, which is the connective tissue in your bones
- having Li-Fraumeni syndrome, Bloom syndrome, or Rothmund-Thomson syndrome, which may increase your risk of developing cancers

These are different stages describe for bone cancer

- **Stage 1 bone cancer** hasn't spread from the bone.
- **Stage 2 bone cancer** hasn't spread but may become invasive, making it a threat to other tissue.
- **Stage 3 bone cancer** has spread to one or more areas of the bone and is invasive.
- **Stage 4 bone cancer** has spread to the tissues surrounding the bone and to other organs, such as your lungs or brain.

Following methods to determine the stage of cancers in the bones:

- a biopsy, which analyzes a small sample of tissue to diagnose cancer
- a bone scan, which checks the condition of the bones
- a blood test to establish a baseline for use during treatment
- imaging tests that include x rays as well as PET,MRI andCTscansto get in-depth views of the bones' structure

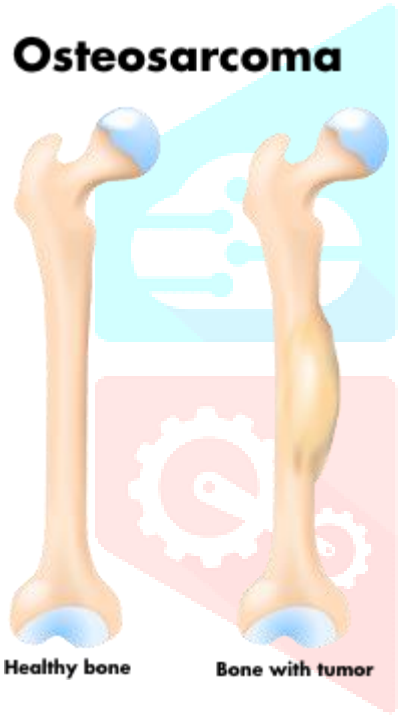

Fig-7 –Bone with tumor

Treatment depends on:

- the stage and grade of cancer
- your age
- your overall health
- the size and location of the tumor

Medications that treat bone cancer include:

- chemotherapy drugs for MM
- pain medications to relieve inflammation and discomfort
- bisphosphonates to help prevent bone loss and protect bone structure

- cytotoxic drugs to prohibit or stop the growth of cancerous cells
- immunotherapy drugs to encourage the body's immune system to kill cancer cells

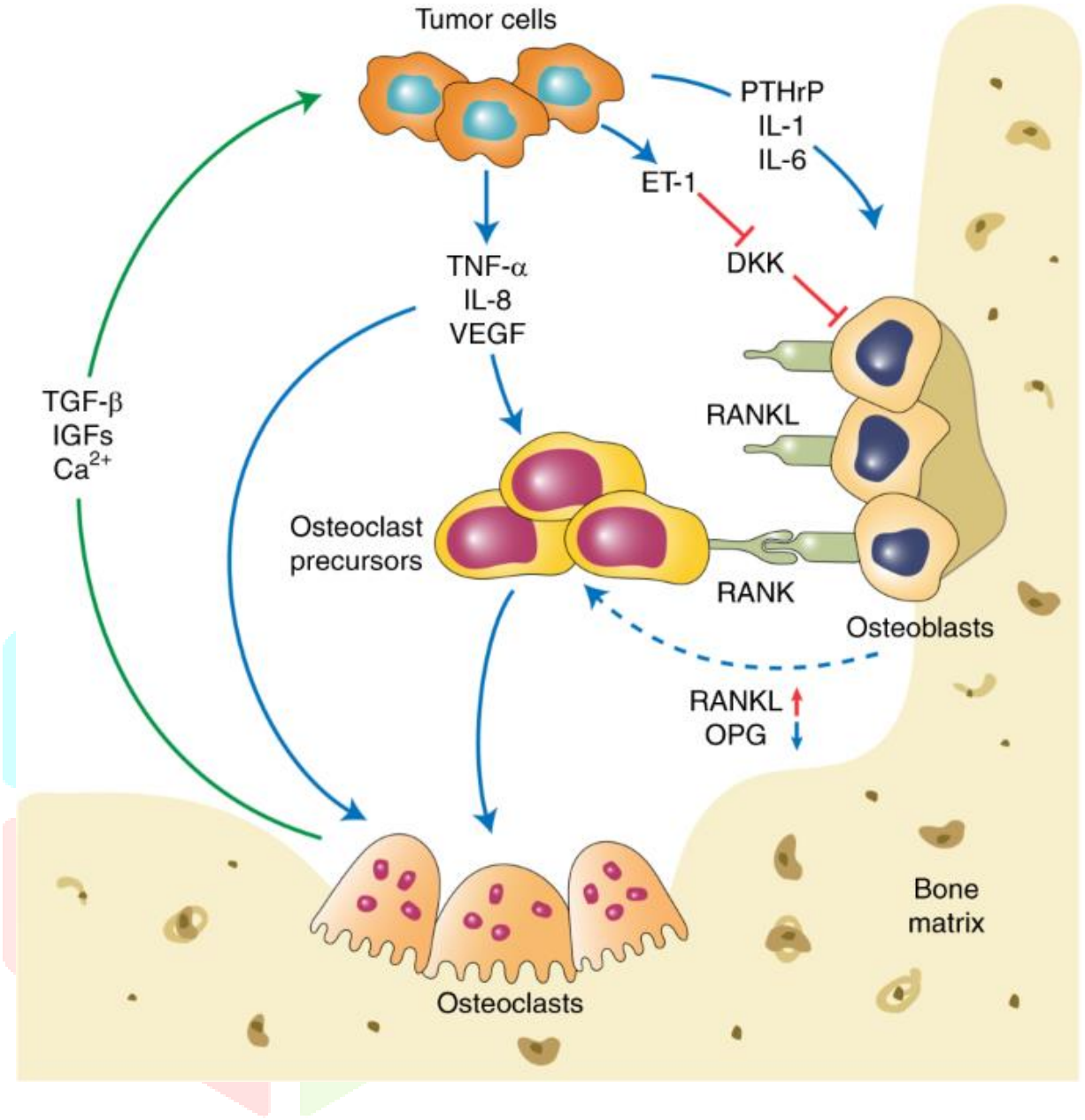

Fig-7 Bone cancer Mechanism

The first symptom of bone cancer is usually pain or tenderness near the cancer. Bone pain is caused by stretching of the periosteum (thick membrane that covers bone) by the cancer, or by stimulation of nerves within the bone. Bone pain may be hard to differentiate from ordinary low back pain or arthritis. Usually the pain due to bone metastasis is fairly constant, even at night. It can be worse in different positions, such as standing up, which may compress the cancer in a weight bearing bone. If pain lasts for more than a week or two, doesn't seem to be going away, and is unlike other pain that may have been experienced, it should be evaluated by a physician.

A patient may also experience a pathological fracture as the first sign of bone cancer. A pathological fracture is a break in a bone due to problems within the bone itself rather than by external factors, such as force. Pathological fractures are caused when the cancer destroys enough bone that the skeleton can no longer support normal body functions adequately.

Bone cancer may be evaluated by the use of either radiological tests, surgical biopsy, or blood tests.

Radiological Tests

Radiological tests, including X-ray, bone scan, and skeletal survey, remain the best method for evaluating cancer in the bones.

- **X-ray:** When a patient experiences pain that is suspected to be a result of bone cancer, the first step in diagnosis is usually to X-ray the area near the pain. When enough of the healthy bone in any area is worn away by metastatic lesions, the damaged area will show up as a dark spot on the X-ray that look like holes in the bones.
- **Bone Scan:** A more comprehensive test used to diagnose bone cancer is a type of X-ray called a bone scan. In this test, low level radioactive particles are injected into a vein. They circulate through the body and are selectively picked up by the bones. A high concentration of these radioactive particles indicates the presence of rapidly growing cancer cells.
- **Skeletal Survey:** In order to diagnose blastic lesions, or lesions where extra bone has built up, a skeletal survey may be utilized. This is a form of X-ray. Normally an X-ray is selective for a particular area of concern, but with a skeletal survey, all areas are imaged. All patients with multiple myeloma and many with breast cancer undergo a skeletal survey to detect bone metastases that have not yet developed observable symptoms.
- **Other:** Occasionally, other radiological procedures may be used to assess bone cancer, such as a computed axial tomography (CAT) scan, magnetic resonance imaging (MRI) scan, or PET scan.

Surgical Biopsy

Either a needle biopsy or an incisional biopsy may also be useful for diagnosing bone cancer. During a needle biopsy, the surgeon makes a small hole in the bone and removes a sample of tissue from the tumor with a needle-like instrument. In an incisional biopsy, the surgeon cuts into the tumor and removes a sample of tissue. The tissue is then examined under a microscope to determine whether it is cancerous. Biopsies are best done by orthopedic oncologists—doctors experienced in the diagnosis of cancer involving the bone.

Blood Tests

The early detection of bone cancer is important for effective management. In the past, pain and fractures were often the first signs of cancer involving bones. Unfortunately, by the time these signs occur, the cancer cells are already present and have begun to impact the patients overall bone health. Relying on these signs typically results in a late diagnosis of bone cancer. Blood tests that can detect the presence of bone cancers before they manifest in pain or fractures may be useful for identifying patients that would benefit from treatment before complications develop.

Cancers in the bone cause an increase in bone remodeling activity. Normal bone is constantly being remodeled, or broken down and rebuilt. Cancer cells disrupt the balance between the activity of osteoclasts (cells that break down bone) and osteoblasts (cells that build bone). When cancer cells are in the bones, some proteins, genes, or byproducts from the building blocks of bone are produced at a higher rate than during normal remodeling.

Measuring blood levels of these substances, called biological markers, can be useful for diagnosing cancer involving the bones. Higher levels can indicate that a cancer has progressed. Though most biological markers are not routinely used for the diagnosis of bone cancers at this time, some are very useful, while others show promise for the future.

Bone specific alkaline phosphatase (BSAP) is an enzyme that is present in the cells that participate in bone formation, called osteoblasts. BSAP has been used for many years to detect increases in bone formation activity. Blood levels of BSAP are increased in patients with bone cancer and other conditions that result in increased bone remodeling. Increases in BSAP have been detected in patients with bone metastasis caused by prostate cancer, and to a lesser degree, in bone metastases from breast cancer. Unfortunately, BSAP is not completely specific for cancer because alkaline phosphatases are also produced by other organs and can be elevated by other conditions. Nonetheless, BSAP can be monitored in patients who are known to be at risk of bone metastases.

Conclusion:

The most common types of primary bone cancers include Osteosarcoma, Chondrosarcoma, and Ewing's sarcoma. Osteosarcoma develops in new tissue of growing bones and occurs most commonly in children or adolescents. Chondrosarcoma originates in cartilage, which is a type of connective tissue that serves as a protective layer between bones ends. Ewing 's sarcoma originates in immature nerve tissue within bone marrow. This type of bone cancer also occurs more frequently in children and adolescents. The ribs, pelvis and spine are normally the first bones impacted by bone metastases, while bones more distant from the central skeleton are less frequently affected Less common bone cancers include malignant fibrous histocytoma and fibrosarcoma. These cancers are similar to Osteosarcoma in that they occur mainly in the extremities, except they occur in adults

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