Understanding Advanced Cancer, Metastatic Cancer, and Bone Metastasis

What is advanced cancer?

Different health care providers may not mean the exact same thing when they use the term advanced cancer. Here, when we refer to advanced cancer, we’re talking about cancers that cannot be cured. This means cancers that won’t go away and stay away completely with treatment.

Advanced cancers can be locally advanced or metastatic. (Metastatic cancers have spread from where they started to other parts of the body and are covered in the next section.) Cancers that have spread are often considered advanced when they can’t be cured or controlled with treatment. But not all advanced cancers have spread to other parts of the body. For example, some cancers that start in the brain may be considered advanced because of their large size or closeness to important organs or blood vessels. This can make them life-threatening even though they haven’t spread to other parts of the body. In the same way, not all metastatic cancers are advanced cancers. Some cancers, such as testicular cancer, can spread to other parts of the body and still be very curable.

Locally advanced cancer is used to describe cancer that has grown outside the organ it started in but has not yet spread to distant parts of the body. For example, locally advanced pancreatic cancer is often not curable. But other locally advanced cancers, such as some prostate cancers, may be cured.

If you or a loved one is told that you have advanced cancer, it’s very important to find out exactly what the doctor means. Some may use the term to describe metastatic cancer, while others might use it in other situations. Be sure you understand what the doctor is talking about and what it means for you.
Advanced cancer can often be treated. Even if the cancer can’t be cured, treatment can sometimes:

- Shrink the cancer
- Slow its growth
- Help relieve symptoms
- Help you live longer

For some people, the cancer may already be advanced when they first learn they have the disease. For others, the cancer may not become advanced until years after it was first diagnosed.

As advanced cancer grows, it can cause symptoms that may need to be treated to help control them. These symptoms can almost always be treated, even when the cancer itself no longer responds to treatment.

**What is metastatic cancer?**

**Metastatic cancer is a cancer that has spread from the part of the body where it started (the primary site) to other parts of the body.** When cancer cells break away from a tumor, they can travel to other parts of the body through the bloodstream or the lymph system. (Lymph vessels are much like blood vessels, except they carry a clear fluid and immune system cells.)

This image shows some parts of the lymph system, like lymph nodes and lymph vessels, as well as organs and tissues that contain many lymphocytes (immune cells).
If the cells travel through the lymph system, they could end up in nearby lymph nodes (small, bean-sized collections of immune cells) or they could spread to other organs. More often, cancer cells that break off from the main tumor travel through the bloodstream. Once in the blood, they can go to any part of the body. Many of these cells die, but some may settle in a new area, start to grow, and form new tumors. **This spread of cancer to a new part of the body is called metastasis.**

Cancer cells have to go through several steps to spread to new parts of the body:

- They have to be able to break away from the original tumor and enter the bloodstream or lymph system, which can carry them to another part of the body.
- They need to attach to the wall of a blood or lymph vessel and move through it into a new organ.
• They need to be able to grow and thrive in their new location.
• They need to be able to avoid attacks from the body’s immune system.

Going through all these steps means the cells that start new tumors may no longer be exactly the same as the ones in the tumor they started in. This might make them harder to treat.

**Even when cancer has spread to a new area, it’s still named after the part of the body where it started.** For instance, breast cancer that has spread to the lungs is called “metastatic breast cancer to the lungs” – it’s not lung cancer. Treatment is also based on where the cancer started. If prostate cancer spreads to the bones, it’s still prostate cancer (not bone cancer), and the doctor will recommend treatments that have been shown to help against metastatic prostate cancer. Likewise, colon cancer that has spread to the liver is treated as metastatic colon cancer, not liver cancer.

Sometimes the metastatic tumors have already begun to grow when the cancer is first found and diagnosed. And in some cases, a metastasis may be found before the original (primary) tumor is found. If a cancer has already spread to many places when it’s found, it may be very hard to figure out where it started. If this happens the cancer is called **cancer of unknown primary**.

**Why cancer cells tend to spread to certain parts of the body**

Where a cancer starts is linked to where it will spread. Most cancer cells that break free from the original tumor are carried in the blood or lymph system until they get trapped in the next “downstream” organ or set of lymph nodes. Once the cells are there, they can start to grow and form new tumors. This explains why breast cancer often spreads to underarm lymph nodes, but rarely to lymph nodes in the groin. Likewise, there are many cancers that commonly spread to the lungs. This is because the heart pumps blood from the rest of the body through the lungs’ blood vessels before sending it elsewhere.

**What is bone metastasis?**

A bone metastasis is an area of bone that contains cancer that spread there from somewhere else.

**Cancer can spread to any bone in the body, but metastases are most often found in bones near the center of the body.** The spine is the most common site. Other common sites are the hip bone (pelvis), upper leg bone (femur), upper arm bone (humerus), ribs, and the skull.
Once cancer has spread to the bones or to other parts of the body it’s rarely able to be cured. Still, it often can be treated to shrink, stop, or slow its growth. Even if a cure is no longer possible, treating the cancer may be able to help you live longer and feel better.

**How does bone metastasis cause bone changes and other problems?**

Bone is the supporting framework of the body. Bones are made of a network of fibrous tissue called *matrix*, minerals such as calcium that attach to the matrix and give the bone its strength and hardness, and 2 main kinds of bone cells are *osteoblasts* and *osteoclasts*.

Knowing a little about these 2 kinds of cells can help you understand how bone metastases grow, and how some medicines work to treat bone metastases. The *osteoblast is the cell that forms new bone*, and the *osteoclast is the cell that dissolves old bone*. When these cells are both working right, new bone is always forming while old bone is dissolving. This helps keep the bones strong.

Cancer cells can affect the bones by interfering with osteoblasts and osteoclasts:

- **Often, the cancer cells make substances that turn on the osteoclasts.** This leads to bone being broken down without new bone being made. This weakens the bones. The holes that develop when parts of bones dissolve are called *osteolytic* or *lytic* lesions. Lytic lesions are so weak that they can cause the bone to easily break.

- **Sometimes, the cancer cells release substances that turn on the osteoblasts.** This leads to new bone being made without breaking down the old bone broken down first. This makes areas of the bones harder, a condition called *sclerosis*. The areas of bone where this occurs are called *osteoblastic* or *blastic* lesions. Although these blastic areas are harder, the structure of the bone is not normal and these areas actually break more easily than normal bone.

Bone metastasis can cause other problems as well:

- **When cancer spreads to the bones of the spine, it can press on the spinal cord.** This can cause nerve damage that may even lead to paralysis if not treated.
- **As cancer cells damage the bones, calcium from the bones is released into the blood.** This can lead to problems caused by high blood calcium levels (hypercalcemia).
Why do cancers metastasize to bones?

For cancer cells to spread to other parts of the body, they have to go through many changes:

- They have to be able to break away from the original (primary) tumor and get into the bloodstream or lymph system, which can carry them to another part of the body.
- At some point they need to attach to the wall of a blood or lymph vessel and move through it, out into a new organ.
- They then need to be able to grow and thrive in their new location.

All the while, the cancer cells need to be able to avoid attacks from the body’s immune system. Going through all these steps means the cells that start new tumors may no longer be exactly the same as the ones in the tumor where they started, but they will still be called the same name. For instance, breast cancer that spreads to the bone is called metastatic breast cancer, not bone cancer.

What’s the difference between primary bone cancer and bone metastasis?

Some cancers start in the bone, rather than spreading to the bones from somewhere else. Cancers that start in the bone are called primary bone cancers. These cancers are very different from bone metastases. Bone metastasis is much more common than primary bone cancers, especially in adults.

Information on different types of primary bone cancers can be found in Bone Cancer¹, Osteosarcoma², and Ewing Family of Tumors³.

Hyperlinks

2. www.cancer.org/cancer/osteosarcoma.html

References
