

AVASCULAR NECROSIS

What is avascular necrosis?

Avascular necrosis (AVN) literally means “dead bone”. It is a disease resulting from the temporary or permanent loss of the blood supply to the bone. This decreased circulation causes cells in the bone and bone marrow to die. If the process involves the bones in a joint, it can lead to collapse of the joint surface. This disease entity is also known as “osteonecrosis”, “aseptic necrosis” and “ischemic bone necrosis”.

What causes avascular necrosis?

Avascular necrosis has many causes. Loss of blood supply to the bone can be caused by a traumatic injury or by cumulative trauma to a joint. Other risk factors include diseases such as sickle cell anemia and thalassemia, that result in abnormal red blood cells, which can block the blood supply in vessels leading to avascular necrosis. Taking corticosteroid medication such as prednisone, particularly in high doses, or excessive alcohol use, can also lead to avascular necrosis. Although there are at least 20 “diseases” associated with AVN most often there is no associated factor; this is termed “idiopathic”. Patients placed on high dose prednisone for brain injuries, asthma, immune suppression (e.g. after a kidney or liver transplant), severe dermatologic conditions, or asthma are at risk for potentially developing AVN. AVN may affect one joint (monoarticular) or multiple joints (polyarticular). AVN most commonly affects the hip, knee, and shoulder but many other joints can be affected.

What are the symptoms of avascular necrosis?

In the early stages of avascular necrosis, patients may not have any symptoms. Eventually, pain, both at rest and with movement of the joint will develop. Pain usually develops gradually and may be mild or severe. The pain may be severe enough to limit the patient’s range of motion in the affected joint. The length of time between the first symptom of pain and the loss of joint function can vary from patient to patient, ranging from a couple of months to over a year.

One hallmark of AVN is severe night pain. In the knee region it often presents in middle aged (females more common than males) suddenly. As noted there may not be associated risk factors.

How is it diagnosed?

Early diagnosis of avascular necrosis is important in order to prevent the affected bone from collapsing. Information obtained from your medical history, along with the results of a physical examination, can make your physician suspicious for avascular necrosis.

First, plain X-rays should be obtained. The X-rays may appear to be normal because X-rays are not sensitive enough to detect bony changes in the early stages of the disease. However, X-rays can reveal bony changes in the later stages of the disease, and once the diagnosis is made, can be used to monitor the course of the condition. Xray changes may demonstrate loss of joint space contour, joint space collapse, fragmentation, and loose bodies. One may see decreased bone density adjacent to the joint space with a surrounding area of increased bone density; this is referred to as a “crescent sign”.

Magnetic resonance imaging (MRI) is the most common diagnostic test used to diagnose avascular necrosis. Unlike X-rays, an MRI can detect changes in the bone marrow and can show avascular necrosis in its earliest stages before the joint space has begun to fragment or collapse and often before any xray changes are detectable.

What is the treatment for avascular necrosis?

Prompt treatment for avascular necrosis is essential to keep the joint surface from breaking down. If untreated, most patients will experience severe pain and limitation of joint motion within one to two years. To determine the most effective treatment, your physician will assess your age, the stage of the disease, the location and amount of bone affected and the underlying cause (steroids, alcohol use, etc.).

The first line of treatment is conservative (non-surgical). Anti-inflammatory medication can be prescribed to help reduce pain. Reducing weight bearing by putting you on crutches for approximately four to six weeks can slow the damage and promote natural healing. Physical therapy modalities can be utilized in an effort to promote maintenance of muscle strength while on crutches. In the earliest stages of AVN strict nonweight bearing can provide dramatic pain relief. If the patients respond in this fashion the prognosis is generally favorable.

If conservative treatment does not bring lasting pain relief, surgical treatment may be necessary to repair the joint. Treatment varies dependent upon the severity of the process. A “core decompression” is a surgical procedure that removes the inner layer of bone, which reduces pressure within the bone, and, creates increased blood flow to the area, which promotes bone healing. This procedure works best in people who are in the early stages of avascular necrosis, before the joint surface collapses. Core decompression is generally performed arthroscopically. Occasionally patient may present to the office with advanced AVN and mechanical locking symptoms secondary to multiple loose bodies as a result of joint space collapse and fragmentation. In this setting an arthroscopic procedure to remove multiple fragments can be helpful to alleviate “locking” symptoms. For individuals who are in the more advanced stages, an “osteotomy” may be indicated. This is a surgical procedure that realigns the bones of the joint to take pressure off the affected area, which, in turn, provides pain relief. If the condition of the joint deteriorates to a point where a core decompression or an osteotomy are no longer viable options, then a “joint replacement” procedure may be necessary. In

this surgery, the affected joint is removed and replaced with artificial parts. Three to four months of post-operative physical therapy can be expected, after any of the procedures mentioned above, before full range of motion and strength is restored.

For many people with avascular necrosis, treatment can be an ongoing process. It is important to work closely with your orthopedic surgeon to ensure the appropriate treatments are used.