What is a Avascular Necrosis?

Avascular necrosis is a disease resulting from the temporary or permanent loss of the blood supply to the bones.[1] Without blood, the bone tissue dies and causes the bone to collapse.[1] If the process involves the bones near a joint, it often leads to collapse of the joint surface. This disease also is known as osteonecrosis, aseptic (bone) necrosis, and ischemic bone necrosis.[1]

Causes

There are many theories about what causes avascular necrosis. Proposed risk factors include alcoholism[2], excessive steroid use,[3] post trauma,[4][5] caisson disease (decompression sickness),[6][7] vascular compression,[8] hypertension, vasculitis, thrombosis, damage from radiation, bisphosphonates (particularly the mandible),[9] sickle cell anaemia,[10] and Gaucher's Disease.[11] In some cases it is idiopathic (no cause is found).[12] Rheumatoid arthritis and lupus are also common causes of AVN.

Presentation

While it can, by definition, affect any bone, and half of cases show multiple sites of damage, this disease primarily affects the joints at the shoulder, knee, and hip. It can also affect the lower large intestine, resulting in anal leakage.

Although it can happen in any bone, avascular necrosis most commonly affects the ends (epiphysis) of long bones such as the femur, the bone extending from the knee joint to the hip joint. Other common sites include the humerus (the bone of the upper arm),[13][14] knees,[15][16] shoulders,[13][17] ankles and the jaw.[18] The disease may affect just one bone, more than one bone at the same time, or more than one bone at different times.[19] Avascular necrosis usually affects people between 30 and 50 years of age; about 10,000 to 20,000 people develop avascular necrosis of the head of the femur in the US each year. When it occurs in children at the femoral head, it is known as Legg-Calvé-Perthes syndrome.[20]

Diagnosis

Orthopaedic doctors most often diagnose the disease except when it affects the jaws, when it is usually diagnosed and treated by dental and maxillofacial surgeons.

Because early x-rays are usually normal in the early stage of the disease, bone scintigraphy[21] and MRI[22] are the diagnostic modalities of choice since both can detect minimal changes at early stages of the disease. Late radiographic signs include a radiolucency area following the collapse of subchondral bone (crescent sign) and ringed regions of radiodensity resulting from saponification and calcification of marrow fat following medullary infarcts.

Treatment

Avascular necrosis is especially common in the hip joint. A variety of methods are now used to treat avascular necrosis,[19] the most common being the total hip replacement, or THR. However, THRs have a number of downsides including long recovery times and short life spans. THRs are an effective means of treatment in the geriatric population, however doctors shy away from using them in younger patients due to the reasons above. A new, more promising treatment is metal on metal (MOM) resurfacing. It is a form of a THR, however in this procedure, only the head of the femur is removed as opposed to a THR in which the entire neck is removed. MOM resurfacing is still experimental in America but has been endorsed in Great Britain as an excellent alternative to a THR. A MOM Resurfacing may not be suitable in all cases of Avascular Necrosis, its suitability depends on how much damage has occurred to the femoral head of the patient, bone is always undergoing change or remodelling.[23] The bone is broken down by osteoclasts and rebuilt by osteoblasts.[23] Some doctors also prescribe bisphophonates (e.g. alendronate) which reduces the rate of bone breakdown by osteoclasts, thus preventing collapse (specifically of the hip) due to AVN.[24]
Other treatments include Core Decompression, where internal bone pressure is relieved by drilling a hole into the bone, and living bone chip and electrical device to stimulate new vascular growth are implanted; and the Free Vascular Fibular Graft (FVFG), in which a portion of the fibula, along with its blood supply, is removed and transplanted into the femoral head.[25]

Progression of the disease could be halted by transplanting nucleated cells from bone marrow into avascular necrosis lesions after core decompression, although more research is needed to establish this technique.[26][27]

Prognosis

The amount of disability that results from avascular necrosis depends on what part of the bone is affected, how large an area is involved, and how effectively the bone rebuilds itself. The process of bone rebuilding takes place after an injury as well as during normal growth.[23] Normally, bone continuously breaks down and rebuilds—old bone is reabsorbed and replaced with new bone. The process keeps the skeleton strong and helps it to maintain a balance of minerals.[23] In the course of avascular necrosis, however, the healing process is usually ineffective and the bone tissues break down faster than the body can repair them. If left untreated, the disease progresses, the bone collapses,[1] and the joint surface breaks down,[12] leading to pain and arthritis.[12]

Avascular necrosis cut short the football and baseball careers of star athlete Bo Jackson.[28]

Other sports stars with this condition are former NFL running back Garrison Hearst, cyclist Floyd Landis, NFL quarterback Brett Favre, professional wrestler "Superstar" Billy Graham, wrestler Joe Heat, Number one draft pick for the Minnesota Lynx: Ben Dvorak, NBA player Jorge Garbajosa and the drummer/singer of the band, The Monkees, Micky Dolenz.

References


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