Kienböck Disease

Kienböck disease, or avascular necrosis of the lunate, is a condition in which one of the central bones in the wrist—the lunate bone—loses its blood supply, leading to death of the bone. The lunate is one of eight small carpal bones in the wrist and it is important for proper movement and support of the wrist. The lunate, along with the bones on either side of it—the scaphoid and triquetrum—make up the proximal carpal row. This row of bones connects with the two forearm bones (the radius and ulna), to form the portion of the wrist that provides the most motion **(Figure 1).** Damage to the lunate can lead to pain, stiffness, and in late stages, arthritis of the wrist. Kienböck disease is most common in men between the ages of 20 and 40 and rarely affects both wrists.

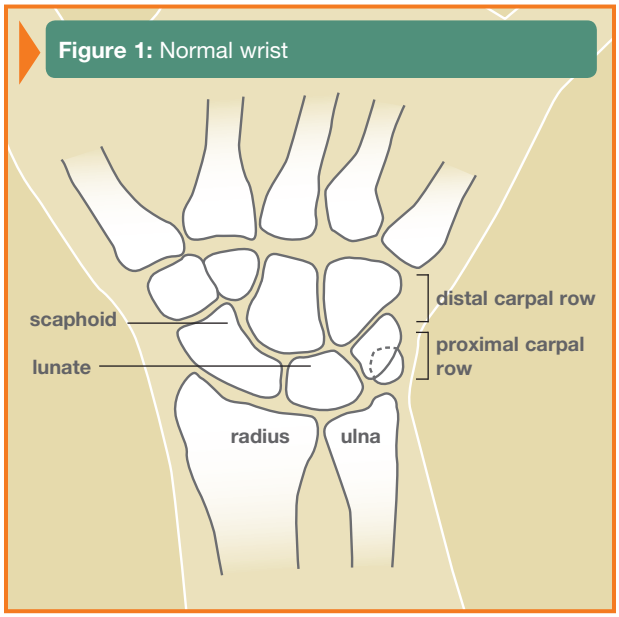

Figure 1: Normal wrist

Causes

There is probably no single cause of Kienböck disease. Its origin may involve multiple factors, such as the blood supply (arteries), the blood drainage (veins), and skeletal variations. Skeletal variations associated with Kienböck disease include a shorter length of the ulna, which is one of the forearm bones, and also the shape of the lunate bone itself **(see Figure 2)**. Trauma, either single or repeated episodes, may possibly be a factor in some cases. Kienböck disease can be found more commonly in people who have medical conditions that affect blood supply, and it is also associated with diseases like lupus, sickle cell anemia, and cerebral palsy.

Diagnosis

Most patients with Kienböck disease initially present with wrist pain. There is usually tenderness directly over the lunate bone, decreased motion or stiffness of the wrist, and there can be swelling. The diagnosis of Kienböck disease can often be made based on history, physical examination, and plain x-rays. In early stages, the x-rays may be normal and special studies are needed to confirm the diagnosis. Probably the most reliable special study to assess the blood supply of the lunate is Magnetic Resonance Imaging, or MRI **(Figure 3)**. CT scanning, specialized CT scanning, and bone scan may also be used.

Patients often have the condition for months or even years before they seek treatment, and especially in its earlier stage it can be difficult to diagnose.

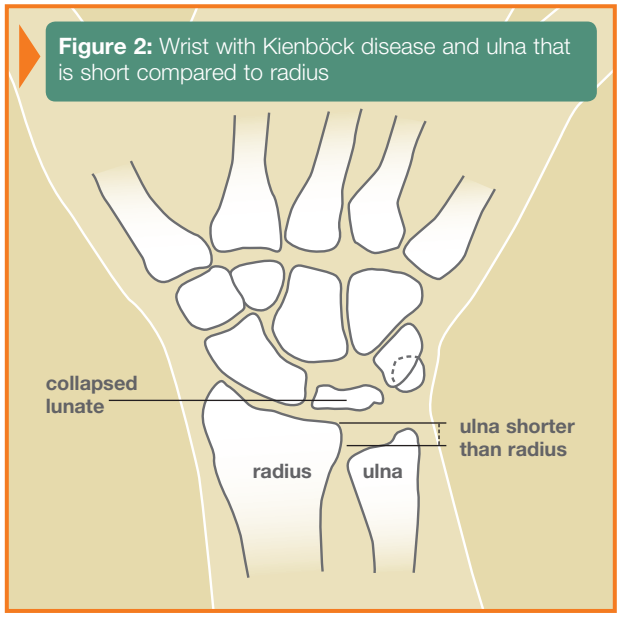

Figure 2: Wrist with Kienböck disease and ulna that is short compared to radius

Course

The progression of Kienböck disease varies but is usually slow over many years. There are 4 stages used to classify Kienböck disease. In stage 1, x-rays appear normal, but the lunate has lost its blood supply and is painful and may fracture. In stage 2, the bone hardens due to lack of blood supply and appears abnormally dense on X-ray. In stage 3, the bone collapses and fragments. In the final stage, stage 4, the lunate is collapsed and the bones around the lunate have developed degenerative changes and become arthritic. In the early stages there may be only pain and swelling, but as the disease progresses the mechanics of the wrist become altered, which puts abnormal stresses and wear on the joints within the wrist itself. One should be aware that not every case of Kienböck disease progresses through all stages.

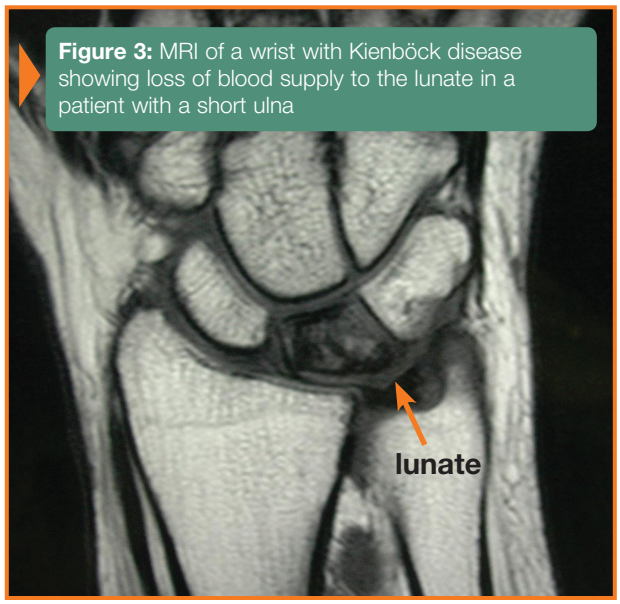

Figure 3: MRI of a wrist with Kienböck disease showing loss of blood supply to the lunate in a patient with a short ulna

Treatment

Treatment options depend upon the severity and stage of the disease. In very early stages, the treatment can be as simple as observation or immobilization. For more advanced stages, surgery is usually considered to try to reduce the forces on the lunate bone by lengthening, shortening, or fusing various bones in the forearm or wrist. Surgery can also be aimed at trying to restore blood supply to the lunate (revascularization), using a bone graft with a blood vessel attached to it. This is not an option in more advanced stages if the relationship of the bones has markedly deteriorated; complete wrist fusion may then be the preferred treatment.

Hand therapy does not change the course of the disease; however, hand therapy can help to minimize the disability from the problem. Treatment is designed to relieve pain and restore function.

Your hand surgeon will advise you of the best treatment options and explain the risks, benefits, and side-effects of various treatments for Kienböck disease.

Prognosis

The results of Kienböck disease and its treatment vary considerably depending on the severity of the involvement and whether or not the disease progresses. The disease process and response to treatment can take several months. On occasion, several forms of treatment, and even multiple operations, might be necessary.