

Spinehealth and Disease

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Patients with certain blood related (systemic) conditions are more likely to develop complications associated with spine disorders and spine surgery. The most common systemic disorders which fall into this category are diabetes, autoimmune disease, blood clotting disorders, and inflammatory arthritis. Patients with one or more of these disorders are at greater risk for developing complications associated with surgery than individuals without the disease.

The success of any surgical procedure is dependent upon a number of factors including the patient's overall health, their willingness to comply with physician recommendations, their ability to adhere to a post-operative rehabilitation approach as well as the presence of a chronic systemic condition. Common chronic conditions include diabetes and inflammatory arthritis, the later which may develop secondary a systemic disorder involving the immune system.

Individuals with diabetes and poor blood sugar (glucose) regulation are susceptible to the development of neuropathy. Although nerves in the feet and hands maybe affected first, diabetic neuropathy may affect nerves of the spine as well. Poor control of blood sugar (glucose) levels in diabetes results in a greater susceptibility to nerve compression and impaired tissue healing, an important consideration for spine surgery and spine rehabilitation. Diabetics are also more likely to have peripheral blood vessel disease, which could adversely impact the outcome of spine surgery. Blood glucose regulation can easily be monitored by using a combination of available tests which include a fasting blood glucose level, two hour post-prandiol glucose level, a glucose tolerance test and the periodic use of a glycohemoglobin A1c test which gives an indication of he average blood glucose control over the previous 8-12 weeks.

Any condition which promotes inflammation of spinal tissues will influence both non-operative and operative outcome. A blood clotting disorder (coagulopathy) can lead to inflammation within tissue due to excessive bleeding or excessive clotting which restricts blood flow. There are numerous blood (laboratory) markers which can be use to help identify and quantify systemic inflammation, coagulopathy and related disorders. Some inflammation is normal and required for tissue to heal properly. The presence of too much inflammation for too long can have many adverse consequences including pain, enhanced risk for scar tissue /adhesion development (fibrosis) and subsequent loss of tissue mobility.

Inflammatory arthritis is characterized by the presence of increased white blood cell activity within and around a joint which promotes the development of acute and chronic inflammation. Abnormal levels of inflammation leads to the development of scar

tissue (restrictive adhesions) and adverse tissue remodeling with loss of tissue elasticity/flexibility. Persistent inflammation sensitizes specialized nerve endings thus leading to an "over firing of nerves" with magnified pain levels.

One of the most common causes for an inflammatory arthritis is an underlying autoimmune disorder. Inflammatory arthritis may be associated with neck and/or back pain. Involvement is generally not limited to the spine but also involves extremity joints. In some cases extremity joint involvement is more prevalent and symptomatic than spinal involvement. The spine pain typically arises secondary to soft tissue inflammation of the spinal (facet) joints and sometimes from tendons and ligaments. The intervertebral disc is typically spared due to its lack of blood supply. Inflammatory arthritis (arthropathies) which involve the spine may also be referred to as spondyloarthritides. They are often characterized by the development of inflammation around the enthesis (the site of ligament insertion into bone).

Inflammatory arthritis can impede recovery after spine surgery contributing to direct and indirect post-surgical complications. Indirect complications which may result in poor surgical outcome include increased risk for infection due to lowered immunity secondary to drug therapy, compromised vertebral bone and acquired structural deformities of the spinal (facet) joints.. Chronic use of steroids to control disease mediated inflammation increases the risk for avascular necrosis (AVN). This is a condition associated with reduced blood supply to bone, which can lead to ischemia and death of bone tissue. It more commonly affects the large weight bearing hip joints.

In patients with inflammatory arthritis the immune system "perceives" the cartilage of the spinal (facet) joints as a foreign substance. The synovium, a thin layer of tissue which surrounds the joint and which secretes a lubricating fluid that delivers nutrients to the cartilage, becomes inflamed and thickened. The immune mediated inflammatory response which follows, causes the joint cartilage to breakdown (erode), resulting in pain, stiffness, and progressive destruction of the joint. The following represents a list of various forms of inflammatory arthritis all of which can afflict the spine. Each has a characteristic clinical and laboratory presentation.

- Rheumatoid arthritis
- Juvenile rheumatoid arthritis
- Psoriatic arthritis
- Ankylosing Spondylitis

- Reactive arthritis
- Lupus erythematosus
- Lyme disease

In inflammatory disorders, problems develop due to an overreaction of the immune system, and through the release of various signaling chemicals. An autoimmune disorder causes an individual's immune system to become activated (stimulated) against proteins normally found in the body. The body essentially launches an attack on some of its own cells. The autoimmune response may be limited to certain organs or tissues. The presence of autoimmune disease may increase the risk for surgical graft or surgically implanted instrumentation rejection. Autoimmune disorders may be associated with inflammation of certain tissues of the spine.