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Pathophysiology of hypertension in systemic lupus erythematosus

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Systemic lupus erythematosus (SLE) is an autoimmune inflammatory disease in which the body's immune system mistakenly attacks healthy tissues in the body. Lupus attacks the skin, kidney, blood, muscles, bones, joints, etc. The exact cause of lupus is not known but it is thought to involve a combination of genetics and environmental factors. To better understand lupus, several different mouse models of lupus have been studied to try and understand the underlying genetic and immunologic mechanisms that cause this autoimmune disease. Women are more prone to develop the disease after they have reached adolescence, however men are at risk as well. The symptoms of lupus vary and can be different everyday and not everyone with the disease will have the same symptoms. Some symptoms include skin rash, mouth ulcers, sensitivity to the sun, fatigue, loss of appetite, joint pain and stiffness, etc. A major indicator that someone has lupus is a butterfly rash across their face. The mechanism of lupus involves an immune response by autoantibodies against a person's own tissue. These are most commonly known as anti-nuclear antibodies and they result in inflammation. These antibody attacks are the main cause of lupus erythematosus. High blood pressure known as hypertension is one of the many risk factors of lupus. Hypertension is a major risk factor for the progression of renal, vascular and cardiac diseases. Several studies have shown that patients with systemic lupus erythematosus had up to a 74% chance of developing hypertension, while on the other hand patients without systemic lupus erythematosus had less than a 2.7% chance of developing high blood pressure. Understanding how high blood pressure develops in the chronic autoimmune disease will help lupus patients better understand what is going on inside their bodies and taking precautions to try and live a healthier lifestyle. By understanding how lupus develops high blood pressure it contributes to understanding the role of the immune system and chronic inflammation in the progression of hypertension. Although, an exact reason for the reasoning behind systemic lupus erythematosus hypertension has not yet been confirmed, it is likely that inflammatory cytokines are a key player in the pathogenesis. Just as all types of hypertension, research has shown that impaired renal function is a major factor and is negatively affected by chronic inflammation. The purpose of this article was to look at the different factor that are linked with the cause of hypertension, and to compare and analyze how they altered with the progression of Systemic lupus erythematosus hypertension and to determine whether these factors had an effect on lupus hypertension and as well as too see if they might contribute to

increased inflammatory cytokines and impaired renal function during systemic lupus erythematosus. The kidneys play a vital role in helping regulate our blood pressure. The kidneys release an enzyme called renin that helps with controlling blood pressure. It is not uncommon that a major factor contributing to the development of SLE hypertension is compromised renal function. According to the article, about 50% lupus patients are affected with glomerulonephritis, which are kidney diseases. It's Also not unlikely that people start to think that lupus hypertension is simply due to nephritis which is inflammation of the kidneys. However that is not always the case and most factors such as impaired renal hemodynamics or tubular function, in addition to nephritis and nephron loss, contribute to impaired renal function and the development of SLE hypertension. Generally speaking in all forms of hypertension, the pressure-natriuresis dynamic is altered, so that a higher pressure is required to excrete the same amount of sodium. In patients with lupus, glomerular filtration rate and renal plasma flow are decreased, which is consistent with renal vasoconstriction and a rightward shift in the pressure-natriuresis relationship. This supports the idea that renal hemodynamics play a major part in the emergence of SLE hypertension. Although there is evidence linking hypertension to compromised endothelial function, it is extremely difficult to determine whether this is the cause of hypertension in lupus patients. The high risk of developing atherosclerosis is one of many studies indicating that the endothelium is significantly impacted during lupus. During lupus, endothelial cells may be stimulated to express cell adhesion molecules by circulating autoantibodies and other inflammatory mediators. Lupus is also associated with increased levels of circulating endothelial cells, a marker for vascular injury. Studies on patients with lupus have shown that their brachial artery flow indicates a decrease in vascular endothelial function. Despite the huge significance of these studies involving the effect and reason behind hypertension in lupus patients the cause is still very difficult to determine because of the variety of patients and the treatments and medications lupus patients have to administer daily that can alter with hormones. For example many lupus patients are usually prescribed to take corticosteroids which can actually alter and cause endothelial dysfunction and high blood pressure. Consequently, it is unclear whether lupus hypertension is caused by impaired endothelial function. Another additional mechanism that contributes to hypertension in lupus patients is oxidative stress. Oxidative stress is very harmful and happens when your body has too many free radicals and not enough antioxidants to fight them off. To best describe, SLE disease activity correlates directly with serum levels of malondialdehyde, a marker of oxidative stress and inversely with serum levels of superoxide dismutase and glutathione

peroxidase. Obesity and diabetes in lupus patients are also 2 other major risk factors for high blood pressure.

Systemic lupus erythematosus is an autoimmune disease that has a high risk of developing renal disease in patients, as well as putting patients at cardiovascular risks. Lupus patients are at high risk for developing hypertension. The many different factors that are linked to hypertension in lupus patients include glomerulonephritis, oxidative stress, compromised renal function, impaired renal hemodynamics, and etc. It may be at times very hard to determine the pathophysiology of hypertension in lupus patients and the reasoning to why it happens because of patients diversity and also because many lupus patients take very strong medications such as steroids like prednisone and medrol that can affect their blood pressure. Systemic lupus erythematosus is extremely hard to live with, it is important to try and learn what the physiology is behind it to help lupus patients live a healthier lifestyle.

Works Cited

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