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Biology 100

The Daily Medical Journal:

Women and their Struggles with Autoimmune Diseases

Good Evening, my dear readers. Our topic today is one of a curious sort: autoimmune diseases and their proclivity to target women. Before I get into that, here is a quick rundown on the human body's immune system and what causes autoimmune diseases. The immune system fends off the ferocious invaders of disease and infection(7). Imagine a criminal breaking into your home. The first thing you would do is grab a bat or gun to defend yourself and deter the intruder. Well, the intruder is the disease, your body is the home and the gun or bat is your immune system.

Furthermore, the immune system can be broken down into two categories: the innate and adaptive. Everybody has an innate immune system; it is the one you enter the world with(2). The adaptive immunity, however, is one that is built up and toughened when it comes into contact with disease and infection; this is one that you develop as you go along in life(2). Now, let's develop an analogy for these two systems. Imagine the innate immune cells, known as phagocytes, are security guards(2). They are always patrolling your body, keeping an eye out for intruders. They are the first to respond when they happen upon an unwelcome stranger. Similarly, the innate immune cells are the first to attack pathogens. The phagocytes surround and overwhelm diseased and infected attackers until they simply perish(2). Adaptive immune cells, however, are like the SWAT Team. They are on call for mysterious and unknown threats. When the innate phagocytes cannot deal with a mysterious threat, the adaptive cells, known as B lymphocytes, swoop and rush in to the rescue. These guys are what build up immunity to diseases. Once they encounter a threat, they will be ready for it next time(2).

Enough of that now. What is an autoimmune condition then? Let's go back to the security guard. Imagine that it is really dark and no one can see; not even the security guard. And, suddenly, an intruder attacks! Since it is dark, the security guard will not know who to target. As a result, they may end up hurting their fellow guards. Likewise, the immune system can become confused and target the body, like vital organs, instead of disease and infection(7). Symptoms of

autoimmune diseases manifest themselves as rashes sometimes. Why? Well, is not skin an organ? That is why one should consider the plausibility of having an autoimmune condition if they are consistently developing a rash(9).

Now that we have developed a basic and working understanding of the immune system and what causes autoimmune diseases, let us move onto its curious proclivity to frequently attack women over men. In our article today, we will traverse the stories of 3 women who have had to manage and live with the struggles of autoimmune conditions. Before, however, here are some statistics covering the tendency of autoimmune conditions to develop in women. Generally, around 24 million people struggle with autoimmune conditions in the US(7). Furthermore, I keep telling you that women often struggle more with autoimmune conditions but don't just take my word for it. "Women have stronger immune responses to infections and vaccination than men. Paradoxically, the stronger immune response comes at a steep price, which is the high incidence of autoimmune diseases in women" (6). Interestingly, it is still not understood why autoimmune conditions occur in the first place; more than that, why women suffer from it more than men(2).

Ok, so now we have established that, unfortunately, women tend to, overall, struggle more with autoimmune conditions. The reason for which is still not yet fully understood. It deals primarily with estrogen which is a double-edged sword: estrogen both inhibits and stimulates autoimmune conditions, depending on what condition it is. Estrogen more often than not exacerbates autoimmune conditions, like SLE(lupus). However, it can prevent conditions in certain instances(6).

Brenda:

This brings us to our first lady who has had an unfortunate encounter with SLE(Systemic Lupus Erythematosus). Her name is Brenda. She is 32 years old. In her twenties, she revealed in an interview that she developed lupus after becoming pregnant. Previously, she was a perfectly normal and healthy adult. However, upon becoming pregnant, she experienced unusual symptoms. Frequently, she felt faint, feverish and nauseous. Blaming it on pregnancy, she wrote it off as nothing. Soon after rashes began to develop up and down her arms, and aching pain pulsed in her elbow joints with each movement(1). These compounding symptoms were not something she could ignore. She visited her primary caregiver who gave a possible prognosis of SLE based on the

progression of symptoms. SLE, or lupus, is an autoimmune condition that is an all-encompassing attacker, assaulting any and all organs and usually leads to other autoimmune conditions like arthritis(6). On top of the fatigue and skin rashes, lupus can attack the lungs, kidneys and joints, for example. Her caregiver asked if any of her family members suffered from SLE; Brenda's grandmother had. Apparently, on top of estrogen, genetics increase the likelihood of contracting an autoimmune condition(8). Brenda's first concern was her unborn daughter. Would she be safe? Would she be healthy? Her caregiver informed her that, although Lupus makes a pregnancy of higher risk, the baby has high prospects of being healthy upon birth(1). Brenda went on to give birth to a perfectly healthy baby. From there she explored avenues of treatment. Since lupus attacks so many different organs, the solution is not always so simple. A team of caregivers collaborated to provide the right treatment for Brenda, formulating a treatment composed of different immunosuppressive drugs like prednisone and belimumab(1). After a year or so, her symptoms seemed to blip out of existence. Brenda thought she was an exception to the incurable rule of autoimmune conditions. However, reality was not so kind. Autoimmune conditions, she explained, like to come and go in phases known as flares and remission; flares being when lupus returns and remissions, when it temporarily fizzles out(1). Whether it be upon a whim of caprice or the stress of life, her lupus returned a decade later. But, she has learned to live with the pain. Despite her encumbrance, she is a joyful mother of 3 and loves to play beach volleyball...when she has the time.

Karen:

Our second lady who chose to share her story is a lively, 50 year-old woman by the name of Karen. Karen lives on the tropical and warm island of Oahu. With 3 grown kids out of the house, her and her husband made the decision to move to Hawaii. There, she frequently spends her days soaking up the sun and visiting the albatrosses. Karen also suffers from Rheumatoid Arthritis(RA). Surprisingly, she revealed that this is a condition she developed in the last year or so. Her joints frequently ache in the morning, and the clenching of a fist requires a bit of effort. Suffice it to say, stiffness and pain characterize her joints(5). She shared that her body has recently been undergoing a menopausal phase.

Research suggests that the time around menopause is when RA begins to show itself(6). Of course, the cause for the development of RA is still not yet fully understood like that of lupus(6). However, a common theme is that it manifests itself in the menopausal phase. This again lends to the correlation of female hormones and the development of autoimmune conditions(6). Reduced amounts of estrogen and ovarian function portend a development of RA, although, to reiterate, it is not at all fully understood by medical professionals as of yet(5, 6). Regressively, Karen is of a curious sort and likes to understand the workings of things. She learned and passed on to us that RA is the result of your immune system assaulting a membranal lining along one's joints called the synovium(5). This leads to the degradation of joints, cartilage, tendons, ligaments, bone and the shapes of joints(5). That is why, she was telling us, people with severe RA have swollen knuckle joints. This condition is not restricted to one's knuckles, however, and can spread to, really, any joint present in the body(5). Despite these grim prospects, Karen has high hopes. If caught early, treatment can drastically reduce the degradation of RA. Although RA cannot be cured, it can be managed and drastically slowed if caught early and treated with drugs known as DMARDs(disease-modifying antirheumatic drugs)(5). Karen sees no part of being a cripple in her future, she dramatically exclaimed to the journalist, and expects to continue her morning jogs and treks to see the albatross nests.

Nora:

Now, we come to the last of our ladies, Nora. Nora has delivered her story to us via amanuensis. With a voice not her own, she dictated her story to her beloved husband who faithfully recorded each word so that we could share her story with you today. Nora lives with, not suffers she likes to say, MS(Multiple Sclerosis). During her teenage years, Nora explains in hindsight, her signs of MS began to manifest. On her walk to school, her legs would lock up, and she would trip, dropping all of her books(4). During her studies she found it difficult to concentrate, and her eyes would randomly phase in and out of focus(4). She put it off as nothing, for that is the invincibility of youth, she mused. At night her neck would abnormally tingle with each toss and turn; yet another sign of MS(4). In her twenties she admitted that something was wrong with her. She could hardly speak at times, though it was no fault of her will; she was an intelligent student, a

precocious erudite she likes to call herself(4). So, when her speech began to falter, she visited a doctor. Soon enough she came to learn that she was of the unfortunate bunch who had MS. Always someone who sought the deeper meaning of things, Nora asked why she developed MS. Her research quickly came to a halt. Like other autoimmune conditions, no one knows why a person develops MS(4). Hereditary genetics play a part in it, but no one else in Nora's family had MS let alone an autoimmune condition. The "why" still confounds Nora to this day. Despite this, she was able to learn the "what" of MS. MS is a condition that assaults the nerves and, ultimately, the central nervous system(the brain and spinal cord)(4). The immune system assaults the covering of nerve fibers, known as the myelin, which essentially disrupts the body's ability to communicate with itself. It is like driving through the forest and losing cell service on a phone call. However, the cell service does not get better, only progressively worse. Likewise, the body's nerves are permanently damaged(4). There is no treatment for MS; our hearts go out to Nora. One can only receive aid in recovering from the crippling assaults of MS(4). However, Nora lives a peaceful life. Albeit, once in a while, she feels occasional hopelessness and the longing to run as she once did. But, in her words, she "keeps plodding". She spends her days now reading the Bible and smiling at the beauty of God's creation. She longs for the day when she will be with Jesus.

That concludes this evening's edition of The Daily Medical Journal. As we have seen autoimmune conditions are a force to be reckoned with. They present serious medical complications and can wreak havoc upon the body if left untreated. However, there is treatment to be had and management of symptoms. If you or anyone close to you is experiencing any of these systems don't hesitate to reach out to your caregiver. The earlier you catch the autoimmune condition the better.

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