Lifestyle Medicine as Treatment for Autoimmune Disease

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Autoimmune disease (AID), a malfunction of the immune system in which it begins to fight its own healthy cells, is a significant and growing problem in our patient populations. Some estimate that up to 24 million people are affected in the United States, with another 8 million showing positive antibodies predictive of future AID development.[1] There are more than 80 types of AID, including common pathologies such as type 1 diabetes, systemic lupus erythematosus (SLE), multiple sclerosis (MS), and rheumatoid arthritis (RA) as well as rarer diseases that may take years to diagnose. The numbers of AIDs in industrialized nations are increasing at a higher rate than those in non-industrialized nations.[2] While definitive causation is still being investigated, AID is strongly associated with multiple factors including genetics, environmental exposure,[3,4] hormonal changes, infections,[5] and lifestyle.[6,7]

Lifestyle is one of the few modifiable risk factors impacting the development of AID. There is emerging evidence indicating lifestyle medicine is a potential tool to treat AID. Making appropriate lifestyle changes could be the simplest way to slow or stop the increase of AID in industrialized nations.

DIET

Diet is one of the most influential lifestyle factors contributing to the rise of inflammatory and autoimmune diseases in developing countries.[8] A whole-food, predominantly plant-based diet improves immune function and reduces the burden of AID in several ways. It improves the diversity of the gut flora, helps maintain the integrity of the intestinal lining, reduces inflammation and obesity, and maximizes nutrition.[9,10]

A number of studies have specifically looked at RA and diet. One year-long study started with a 7- to 10-day fast, then went to 3.5 months of a gluten-free vegan diet, followed by gradual adoption of a vegetarian diet for the remainder of the study period.[10] Kjeldesen-Kragh et al[10] noted several significant improvements in RA disease activity variables after just 1 month, including number of tender joints, Ritchie's articular index, number of swollen joints, pain score, duration of morning stiffness, and grip strength. The improvements also included objective measurements such as decreased erythrocyte sedimentation rate, C-reactive protein, and white blood cell count, improvements that persisted for 1 year after the study was completed.[10]

A decreased risk in other AIDs has been demonstrated in other studies. A study extrapolating data from the 2013 Adventist Health Study-2 cohort demonstrated a lower incidence of hypothyroidism in participants following vegan diets compared to omnivorous, lacto-ovo vegetarian, semi-vegetarian, and pesco-vegetarian diets after controlling for demographic and body mass index variables.[11]

Research has also been done on psoriatic arthritis and SLE. An observational study was performed on psoriatic arthritis patients and adherence to a Mediterranean diet, which is rich in fruits, vegetables, legumes, whole grains, and fish. Results of the study showed that higher disease activity, measured by the Disease Activity Index for Psoriatic Arthritis (DAPSA), was associated with a lower adherence to the Mediterranean diet.[12] The DAPSA includes reporting of the number of swollen joints (out of 66 joints) and tender joints (out of 68 joints), patient assessment of disease activity and pain, and C-reactive protein levels.

A prospective study of lupus patients in Japan using food frequency questionnaires showed that vitamin B6 and dietary fiber were inversely associated with disease activity.[13]

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Human trials and case reports studying the effect of diet on patients with inflammatory bowel disease, especially those with Crohn's disease, have shown improvement of clinical outcomes by decreasing animal products and increasing whole plant foods. One trial showed that remission was maintained in 15 of 16 (94%) in the group on the semi-vegetarian diet (SVD) vs 2 of 6 (33%) in the group on the omnivorous diet. Remission rate with SVD was 100% at 1 year and 92% at 2 years. The semi-vegetarian diet showed significant reduction in the time to relapse compared to that in the omnivorous group (P=0.0003, log rank test) and remission was maintained at 2 years.[14] In contrast, in a separate study of cases of moderate to severe disease, only 57% of cases were reported to achieve a 6-month clinical remission using infliximab and azathioprine with no dietary intervention.[15]

STRESS

Excessive stress or the inability to adequately manage stress is known to trigger and exacerbate AID. Many retrospective studies have found that up to 80% of patients report uncommon emotional stress before disease onset.[16] We know that stress can trigger the innate immune system to provoke an acute-phase response, perpetuating an inflammatory response.[16]

Psychological stress responses are also closely tied to the sympathetic nervous system and the hypothalamic-pituitary-adrenal axis, and these amplify the activation of the immune system. Studies on patients with RA have shown that social elements, like having supportive relationships and developing effective coping strategies, can be useful prognostic tools in the progression of disease.[17,18] A 24-year study in patients with SLE found that trauma and post-traumatic stress disorder (PTSD) were associated with higher SLE risk.[17] A retrospective study in Sweden explored the relationship of stress-related disorders and AIDs over a 32-year period. During a mean follow-up of 10 years, the incidence rate of AIDs was 9.1, 6.0, and 6.5 per 1000 person-years among the exposed, matched unexposed, and sibling cohorts, respectively (absolute rate difference, 3.12; 95% confidence interval [CI]: 2.99-3.25] and 2.49 [95% CI: 2.23-2.76] per 1000 person-years compared with the population- and sibling-based reference groups, respectively). It was found that an exposure to a stress-related disorder was significantly associated with increased risk of AID compared with unexposed individuals and siblings.[18] A diagnosis of RA, similar to many AIDs, signifies an ongoing daily struggle with a variety of symptoms that may include pain, limitations in function, reduced mobility, and chronic fatigue.[16] Equipping patients with and/or educating them about resources that can help manage and reduce stress may be a potential way to downregulate the chronic burden of their disease.

SLEEP

Poor sleep and altering of natural circadian rhythms have been shown to worsen many disease states, autoimmune and otherwise. Getting fewer than 7 hours of sleep per night has been correlated with triggering SLE flares, and studies of SLE in animal models suggest that sleep deprivation is a factor in the onset of disease.[19] Chronic insomnia may also be linked to as high as a 70% increased risk for developing an AID, such as Sjögren syndrome.[20]

In a cohort study, it was found that the risk of AIDs, including SLE, RA, ankylosing spondylitis, and Sjögren syndrome, in patients with non-apnea sleep disorder, was significantly higher than in controls (adjusted hazard ratio 1.47; 95% CI: 1.41-1.53). This study used the data from 84,996 adult patients with non-apnea sleep disorder diagnoses recorded in the Taiwan National Health Insurance Research Database between 2000 and 2003, after excluding those with antecedent autoimmune diseases. A comparison cohort of 84,996 participants was formed by age-, gender-, income-, and urbanization-matched controls.[21]

Asking our patients about and working with them to improve the quality and quantity of their sleep appears to be vital in the treatment of AID.

EXERCISE

Educating patients about the benefits of physical activity is an important component in the practice of lifestyle medicine and has a large impact on AID. A review article by Sharif et al[22] noted that patients with AIDs tend to be less physically active than the general population. Those with RA who were physically active were found to have milder disease. Physical activity in patients with MS decreased fatigue and improved mobility, mood, and cognitive abilities. Increased physical activity in patients with SLE was correlated with a better quality of life and cardiovascular disease profile. Better quality of life and decreased pain and disease severity were noted in systemic sclerosis patients with increased physical activity.[22]

A randomized controlled study compared the effect of physical therapy vs usual care in patients with scleroderma. The patients selected had either a disability ratio of 0.5 on the Health Assessment Questionnaire Disability Index (HAD-QI), decreased mouth opening, or a limited range of motion of more than 1 joint. The intervention was personalized to their disability. All patients in the intervention group, regardless of their disability, received muscle strengthening exercises, respiratory exercises, and functional rehabilitation. The intervention was supervised for the first month, followed by 11 months of home-based exercises. After 1 month, there was a significant reduction in disability score and pain and an improvement in hand mobility.[22]

SMOKING

Smoking can cause a number of different diseases including cancer, heart disease, and chronic obstructive pulmonary disease. In addition, smoking can also contribute to AIDs such as RA, arthritis, and SLE. In a meta-analysis, patients who had ever smoked had a 1.89-fold increased risk of RA.[23] Smoking can also increase anti-citrullinated antibodies in RA. In the Nurses' Health Study, patients who were current smokers or had a >10-pack-year history had an elevated risk of developing lupus compared to those who never had smoked.[24]

CONCLUSION

Primary care clinicians have the opportunity to help patients with AID, to support them in managing and reducing the effects of their disease, and, in some cases, to help them bring about remission of their disease with lifestyle medicine. A growing body of evidence is demonstrating the benefits of treating or reducing the risk of AIDs with lifestyle medicine. Recommendations that focus on optimizing a healthful diet, reducing stress, improving sleep, encouraging exercise, and avoiding smoking have been shown to significantly improve outcomes for patients with AID. Additionally, the same lifestyle changes that can improve AID are also those recommended to reduce the burden of many other comorbidities. Although more research is needed, on the basis of the information we currently have regarding how lifestyle changes can affect the causation and perpetuation of these diseases with no risks, there is much to be gained by prescribing lifestyle medicine modalities to our patients as an adjunct to standard treatment protocols. ●

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