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Case Study

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IS AUTOIMMUNE DISEASE A FORM OF DIETARY SUGAR INTOLERANCE? A CASE REPORT

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ABSTRACT

Background: Genetic factors are important in the development of autoimmune diseases and environmental influences are believed to modulate their manifestation. Diet is one of the putative environmental risk factors. **Observations:** I here describe a patient with an autoimmune disorder whose clinical features exacerbate following consumption of diets high in simple sugars but hardly occurred when such foods were avoided. **Conclusion:** Autoimmune diseases may be manifestations of an altered handling of excess simple sugar intake. Simple dietary modifications may potentially prevent or ameliorate the course of these diseases.

KEYWORDS: Autoimmune disease, Environmental influences, Diet, Simple sugar.

INTRODUCTION

Genetic predisposition is a major risk factor for the development of autoimmune diseases. Specific Major Histocompatibility / Human Leucocyte Antigen (HLA) gene alleles are associated with specific disease phenotypes. Some of these genes and their associated diseases include: HLA B27 and ankylosing spondylitis; HLA B8 and Grave's disease; HLADR 4 and rheumatoid arthritis; and HLA DR 2, 3 and systemic Lupus erythematosus.[1]

Environmental triggers are also important risk factors for the manifestation of auto immune diseases. Examples of these diseases and their associated environmental factors include Systemic sclerosis and organic solvents; and Systemic lupus erythematosus and exposure to silica.[2] Diet high in fructose and fast food also has an epidemiologic link with inflammatory bowel disease.[3]

Autoimmune diseases were rarely seen in black Africans in the past.[4] These diseases are no longer infrequent observations.[5-7] Since genes do not change significantly over short periods of time, the increasing occurrence of these diseases in Africa may be due to changing environmental influences. The identification and elimination of such predisposing factors will potentially prevent or ameliorate the course of these diseases.

I here describe a patient with autoimmune skin/soft tissue, joint and pulmonary disorders whose features often followed the consumption of diets high in simple sugars and did not occur when these food types were avoided.

METHODOLOGY

The case records of the patient was reviewed to extract data such as age, gender, symptoms and signs, aggravating and relieving factors, diet history, family and social history, diagnoses as well as the effects of specific food types on her clinical features. Clinical photographs were included.

Ethical issues

Informed consent was obtained from the patient to have her data published for the benefit of the wider society. Ethical clearance for this report was obtained from the Research Ethics Committee of the Ebonyi State University, Abakaliki.

CASE PRESENTATION

The patient is a 31 year old health worker who was admitted into the medical ward of our facility as a student 5years ago with recurrent cough, fever, fatigue, weight loss and skin rashes all of 4years duration. The cough was productive of copious yellowish sputum and was associated with dyspnoea.

Her illness started 9years earlier with sudden onset of pain and swelling of the proximal interphalangeal joints of the right middle finger which later progressed to involve the other hand, wrists, elbows and knees. There was associated fatigue and itchy skin rashes which

occurred as papules, and plaques involving mainly the neck, and upper chest. These healed leaving hypo/hyperpigmened lesions. She later developed nodules over the knees, elbows and thighs which usually broke down spontaneously releasing creamy caseous materials and healed with scarring. Rheumatoid arthritis complicated by chest infection was suspected. She tested negative for rheumatoid factor and was managed with antibiotics and later prednisolone but there was no reasonable improvement. The prednisolone was later withdrawn because of side effects such as weight gain and extreme body weakness. She was so weak that she had to stop schooling for two years during which time she received alternative medical treatment and improved. She could however not continue this treatment because of the cost and her symptoms gradually recurred leading to her readmission. Her maternal grandmother has osteoarthritis of the knees.

On representation 5years ago, she was chronically ill looking, wasted, coughing persistently, dyspnoeic, tachypnoic and had widespread coarse crepitations in the chest. There were also hypo/hyperpipmented patches on the neck and upper trunk as well as symmetrical scars at the knees, thighs and arms (see figs 1-4). She had swelling and tenderness of the right ankle joint. Her chest X-ray showed widespread fibrotic changes in the lungs while an X-ray of the right ankle revealed osteoarthritis. She tested positive to antinuclear antibodies (ANA) but negative to anti double stranded DNA antibodies (anti ds-DNA Abs). A diagnosis of mixed connective tissue disease with chest infection was made. She was managed acutely with antibiotics and high doses of intravenous hydrocortisone and later oral prednisolone. She improved and was discharged.

She was advised to modify her diet by eliminating common sources of simple sugar. This was based on observations made earlier in another patient. She complied by stopping the consumption of table sugar as well as soda, candy, biscuits, cake and also processed carbohydrates such as pasta and reported an immediate improvement in her health within a week. There were no more new skin lesions. The steroids were stopped within a month and she was able to complete her training 3years ago. She had a mild flare-up of her symptoms six months ago when she returned to taking soda and biscuits but this subsided immediately she corrected her diet.

DISCUSSION

This patient has an autoimmune disease with recurrent symptoms whose onset usually coincided with the ingestion of simple sugars. The role of this diet type was further suggested by the observed absence of symptoms when these food types were avoided.

The observations in this patient suggest that regular ingestion of sugar-rich processed foods may be responsible for the current epidemic of autoimmune diseases. This thinking arises also from the observation that autoimmune diseases like Rheumatoid arthritis were rare in Europe before the industrial revolution.[8] Ingestion of most processed food items is associated with hyperglycaemia which has been found to lead to increased production of pro inflammatory cytokines and systemic inflammation via glycation of proteins.[9] The resulting tissue damage at various sites is a continuum that increases with the level of blood glucose and is not limited to the diabetic range and can occur with even mild elevations of blood glucose.[9,10] The pro inflammatory cytokines stimulated become the genesis of the inflammatory reactions producing autoimmunity and continues for as long as the inciting diet is eaten. It has been shown that there is an epidemiologic link between high dietary sugar and the development of inflammatory bowel disease.[3]

Though genetic predisposition is an important risk factor for the development of autoimmune diseases and specific genes are linked to some diseases it is believed that what is inherited is a general tendency to develop autoimmune diseases which results in the development of different autoimmune diseases in different individuals even within some families.[11,12] Thus a single triggering factor such as hyperglycaemia can lead to seemingly different disease phenotypes and also the existence of multiple autoimmune syndromes.

Figures

Fig. 1: Scars following spontaneous eruptions in the patient.

Fig. 2: Some more scars and nodules on the patient.

Fig. 3: Deep post-inflammatory scars following spontaneous eruptions in the patient.

Fig. 4: Hypo and Hyper pigmented macules in the patient.

Hypothesis

In view of the above, I propose a hypothesis that: "in genetically susceptible individuals, persistent hyperglycaemia from diets high in refined sugar may be a trigger for the development of autoimmune disorders; and in affected persons it may exacerbate the clinical manifestation of autoimmune diseases.

CONCLUSION

Increase in the prevalence of autoimmune diseases in many communities parallels the introduction and consumption of diets rich in simple sugar. This pattern of consumption and diseases became widespread after the industrial revolution. Our patient's health improved when her diet was modified to reduce the refined/simple carbohydrate content. It may therefore follow that appropriate dietary measures will not only ameliorate the course of these diseases but possibly prevent their occurrence thereby reducing both personal and global disease burdens. This hypothesis needs to be further investigated.

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