Acupuncture and a gluten-free diet relieve urticaria and eczema in a case of undiagnosed dermatitis herpetiformis and atypical or extraintestinal celiac disease: a case report

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Abstract

Objective: The purpose of this case report is to describe the use of acupuncture and a gluten-free diet (GFD) for urticaria and severe eczema in a patient with undiagnosed dermatitis herpetiformis and atypical or extraintestinal celiac disease.

Clinical Features: A 48-year-old woman presented with intense urticaria, eczema, worsening heartburn, chronic constipation, headaches, and an intense feeling of heat for 4 months. Results of punch biopsies of the skin lesions and laboratory tests were inconclusive. After the acupuncture sessions reported here ended, human leukocyte antigen blood typing revealed celiac disease and dermatitis herpetiformis–associated human leukocyte antigen DQ-8. Results of an endoscopy and colonoscopy were negative.

Intervention and Outcome: The patient received 3 acupuncture treatments a week for 12 weeks. The patient's symptoms began in March 2008. She began using topical and oral steroids and felt that her symptoms were not responding. Acupuncture began in July 2008. At the end of the first 12 treatments, during which she was using topical and oral steroids, the urticaria and constipation resolved completely; and she had temporary relief from the heartburn. It is thought that the urticaria and constipation resolved because of the acupuncture as that was the only change. At the end of the second 12 treatments, during which time she had started Optifast, a GFD, the heartburn, headache, and eczema resolved. At the end of the third 12 treatments, all her symptoms remained resolved. Steroid treatment was discontinued after the first 12 treatments.

Conclusion: Acupuncture and diet changes appeared to provide relief from the urticaria and eczema of dermatitis herpetiformis beyond that obtained by traditional treatment of a GFD alone.

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Introduction

Celiac disease (CD) is described in one of the following 4 ways: typical, atypical or extraintestinal, silent, or latent.^{1,2} All forms, with and without verifiable small intestinal damage and with and without positive anti-gliadin antibody (AGA) testing result, have been associated with increased mortality.³ Only typical CD is associated with the well-documented enteropathic symptoms of diarrhea, weight loss, malabsorption, and the criterion standard positive small bowel biopsy result showing villous atrophy, crypts of hyperplasia, and increased intraepithelial lymphocytes and positive AGA testing result. Patients with other forms can present with minimal or absent gastrointestinal symptoms, minimal or absent damage to the small bowel, and either positive or negative AGA tests. Furthermore, patients can be completely asymptomatic or exhibit primarily extraintestinal symptoms such as eczema, urticaria, fatigue, headaches, heartburn, and various neurological disorders.⁴ The only common finding linking the forms is human leukocyte antigen (HLA) DQ-2 or HLA DQ-8 found on serological typing.

Dermatitis herpetiformis (DH), an intensely pruritic eczematous skin condition that predominantly affects the extensor surfaces of the elbows, knees, buttocks, back, and scalp, is one of the extraintestinal symptoms associated with gluten sensitivity CD.^{5,6} A 69% to 89.5% prevalence of DH is reported with CD.⁷ Dermatitis herpetiformis and CD share the common pathogenesis of a gluten enteropathy; the gut must be exposed to gluten,⁸⁻¹⁰ and they share a common HLA DQ-8 serology.⁹ Human leukocyte antigen DQ-8 is often associated with minimal to absent small intestine damage⁶ and negative AGA test results.⁶

Biopsy of an erythematous DH eczematous papule typically reveals neutrophilic microabscesses within the dermal papillae, a finding also associated with other diseases such as bullous lupus erythematosus. Pathognomonic diagnosis of DH is made by direct immunofluorescence of normal-appearing perilesional skin, about 1 cm from the lesion. This shows a granular deposit of immunoglobulin (Ig) A along the dermoepidermal junction.⁶

According to Traditional Chinese Medicine (TCM), the DH presentation combined 2 components: eczema and urticaria. Eczema in Chinese is *Shi Zhen* or “damp rash,” and urticaria is called *Feng Yin Zhen* or “Wind hidden rash.” Eczema can be described in TCM terms as dampness under the skin caused by a gastrointes-

tinal disorder, usually a spleen *Qi* deficiency. “Wind” in the skin manifests primarily as intense itching and dryness in the skin, just like wind dries the soil in nature.¹¹ There are several different patterns of “Wind” rashes. The DH lesions and symptoms in this particular patient can be described in TCM terms as complaints of an intense subjective feeling of heat—5-palm heat (hot palms, feet, and center of chest). The skin was warm to touch, although the patient was afebrile, and the rash would bleed when scratched. This is called “Blood-Heat.”

The purpose of this case report is 2-fold: (1) to present both the Western and TCM diagnosis of a patient with atypical or extraintestinal CD and DH and (2) to illustrate how one patient’s symptoms of urticaria, eczema, heartburn, and constipation responded to a treatment regimen of acupuncture combined with a gluten-free diet (GFD).

Case report

A 48-year-old woman, 5’6” in height and 161 lb in weight, presented in July 2008 with an acute onset of eczema and urticaria of 4 months’ duration. Permission for publication of personal health information has been given by this patient. The lesions were intensely pruritic, a 10/10 on a 1 to 10 scale of 1 being the least symptomatic and 10 being the most symptomatic. The eczematous lesions were bilateral, symmetrical, and appeared as tiny erythematous vesicles, papules, and urticarial wheals. They began on her scalp where the patient thought she had sustained an insect or spider bite in March 2008 and subsequently spread to her lower back, buttocks, shins, forearms, elbows, and knees. She reported feeling very hot and being anxious and fatigued. In addition, the patient suffered from sleeplessness due to the pruritus and a hot sensation that was worse in the evening. She felt unable to adequately perform her highly stressful executive job because of the associated fatigue, lack of sleep, and inability to fully concentrate. Furthermore, the patient suffered from headaches and gastrointestinal symptoms that included chronic but recently more intense acute heartburn and a lifetime of chronic constipation. She reported no nicotine or alcohol use. On TCM examination, the patient had warm hands and feet. Her tongue was red, peeled with no coating, and cracked in the center. Her pulse was full, superficial, and rapid. Physical examination was normal except for epigastric tenderness and the multiple erythematous

urticarial eruptions described previously. The patient had never suffered from the skin lesions before. She was unsuccessfully using topical corticosteroid and oral steroids to control the itching and was taking esomeprazole twice per day for the heartburn. Her dermatologist had performed punch biopsies over the lesions on her elbow, shoulder, hip, and shin; however, no definitive diagnosis had been reached. Tests were performed on this patient to rule out Lyme disease because the scalp lesion was initially suspected to be an insect bite. Antinuclear antibody testing and CD-associated antibody testing results were negative. The findings in Fig 1 support the diagnosis of DH.

TCM: diagnosis and treatment principles

The TCM diagnoses were 2-fold. The first was Wind-Heat syndrome based on the urticaria associated with a full superficial pulse and red peeled tongue. The second was Blood-Heat based on the presenting full pulse, red peeled tongue, and 5-palm and evening heat sensations along with the eczematous erythematous skin lesions. Treatment included acupuncture and dietary modifications. Treatment objectives were to eliminate Wind and Heat; cool the blood; calm the mind and spirit; and stop the itching sensation, heartburn, and constipation.

Table 1 describes the patient symptoms, TCM physical findings, TCM diagnostic interpretation, and acupuncture points that were selected. Table 2 describes the points selected and TCM treatment principles.

Fig 1. Dermatitis herpetiformis presenting bilaterally on shins of the patient. (Color version of figure is available online.)

Treatment

The patient was gowned to help her stay cool and to access the acupuncture points in an air-conditioned room with relaxing music to help calm the mind and spirit. Treatment was mostly performed with the patient supine because of the acute heartburn she was experiencing and to effectively access *Xuehai* (SP 10) and *Baichongwo* (LE-Extra Point 3). The needle type used was Tai-Chi Power 80 (Lhasa OMS, Inc, Weymouth, MA) 0.25-mm × 30-mm, single-use, sterile needles. An exception was made when the patient was supine with needles in Bladder Meridian or Governor Vessel points. The needle type used for this purpose was longer and more flexible: Tai-Chi Power 80 0.25 × 50-mm single-use, sterile needles. The needles were inserted into the Bladder Meridian and Governor Vessel points and taped down to the patient's skin so that they pointed in the direction of the meridian—caudad and cephalad, respectfully. They remained in place for approximately 45 minutes after arrival of *deqi* (a heavy or pulling sensation) was obtained, usually until the patient experienced near-complete relief from the urticaria, heat sensation, and heartburn. Needles were twirled quickly for reducing effects at desired points, namely, ST 25 and ST 36¹²; and insertion was at a depth of 0.5 to 1.5 cun, depending on the location of the needle. Acupuncture points were needled bilaterally except for *Baihui* (GV 20) and *Dazhui* (GV 14). Needles were removed in the order that they were inserted whenever possible to try to achieve equal retention time for all the points. Treatment was rendered under close supervision.

The patient had 3 acupuncture treatments a week for 12 consecutive weeks, that is, 36 treatments in total. At the end of 12 treatments, the patient began Optifast (Novartis, East Hanover, NJ), a GFD.

In TCM, point selection varies depending on the symptoms the patient is experiencing. After the first 12 treatments, when the urticaria and constipation were markedly relieved, point selection moved more from sedation and cooling toward resolving heartburn or “Rebellious Stomach Qi,” stomach and spleen dampness.

Results

The patient experienced almost complete relief from the pruritus and heartburn while the acupuncture needles were in place. She had relief for up to 24 hours thereafter; she was able to sleep better the night

Table 1 TCM patient symptoms, TCM physical findings, and TCM diagnostic interpretation

TCM patient symptoms	TCM physical findings	TCM diagnostic interpretation	Points used
Urticaria, red rash with severe itching of the skin that can migrate from place to place.	P = full and superficial, rapid T = red, peeled	Wind-Heat syndrome	GV 14, GB 31, GV 20, Extra LE 3 Point <i>Baichongwo</i> , SP 10, LV 3
Erythematous, eczematous skin lesions. Patient feels hot, worse heat in evening. Hands, feet, and chest feel warm to touch.	P = full, rapid T = red, peeled 5-palm evening heat	Blood-Heat syndrome	LI 11, LI 4, BL 40, SP 10, SP 6, GV 14
Heartburn, epigastric fullness, feeling of oppression in the chest.	T = peeled and cracked in center Epigastric tenderness accompanied by constipation	Heat in stomach and intestines, stomach <i>Yin</i> deficiency	ST 25, ST 36, TW 6, ST 44, Ren 12, PC 6, SP 6, ST 21
Chronic eczema, heartburn, low energy, fatigue, abdominal distention	T = peeled and cracked in center	Stomach <i>Yin</i> deficiency, spleen dampness and spleen <i>Qi</i> deficiency	SP 6, SP 9, LV 8, ST 36, BL 20, BL 21, Ren 12, ST 21

T, tongue; P, pulse.

of the acupuncture session, and she felt cooler. The patient received 36 treatment sessions; each treatment was performed 3 times weekly.

The sessions began in July 2008; and by August 2008, at the end of the first 12 treatment sessions, the pruritus was at a level 1/10 compared with 10/10 at the onset, and the constipation had resolved. The eczema was less erythematous, but lesions were still present. The most persistent lesions were on the extensor aspect of her anterolateral legs, along the stomach meridian. The remaining primary complaint besides the skin lesions was heartburn.

In August, the patient also began Optifast to lose weight and diminish the sensation of epigastric fullness. There was a subsequent notable improvement in the skin lesions and gastrointestinal symptoms that was attributed to the gluten-free nature of Optifast. By the end of 24 sessions, the patient reported that the

heartburn and eczema, headaches, as well as the urticaria and constipation were gone. Acupuncture and a GFD were continued to maintain this level of improvement for another 12 sessions, coming to 36 sessions in total.

Discussion

Acupuncture focuses on addressing the health of the whole person, not just treating the disease. In TCM approaches, symptoms are regarded as expressions of imbalances in the body. Different imbalances can, however, produce the same symptoms. Five patients with eczema, for example, may reveal 5 distinctly variant patterns of imbalances and would all be treated very differently.¹³ In acute urticaria, acupuncture is thought to be extremely effective by decreasing the

Table 2 Points selected and TCM treatment principles

LI 4 (<i>Hegu</i>) and LI 11 (<i>Quchi</i>)	To cool the blood, disperse pathogens from skin due to heat accumulated heat in the stomach and intestine
Extra Point 3 (<i>Baichongwo</i>), SP 10 (<i>Xuehai</i>) and BL 40 (<i>Weizhong</i>)	To alleviate itching and eliminate heat from the blood
GV 20 (<i>Baihui</i>) and SP 10	To alleviate urticaria and headache
ST 36 (<i>Zusanli</i>) and ST 25 (<i>Tianshu</i>)	To eliminate heat from the stomach and intestines
H 7 (<i>Shenmen</i>) and LV 3 (<i>Taichong</i>)	To calm the mind, relieve headache, LV 3 in particular to resolve wind condition
Ren 12 (<i>Zhongwan</i>), PC 6 (<i>Neiguan</i>)	To resolve heartburn, descend rebellious <i>Qi</i>
GB 31 (<i>Fengshi</i>)	To eliminate wind heat, treat urticaria
BL 17 (<i>Geshu</i>)	To eliminate evening heat and night sweating
TW 6 (<i>Zhigou</i>)	To alleviate constipation
SP 6 (<i>Sanyinjiao</i>) and SP 9 (<i>Yinlingquan</i>)	To resolve spleen and stomach dampness
GV 14 (<i>Dazhui</i>)	To reduce heat in the yang meridians
ST 44 (<i>Neiting</i>)	Cools heat in stomach, directs <i>Qi</i> downward
ST 21 (<i>Liangmen</i>)	Resolves epigastric pain
BL 20 (<i>Pishu</i>), BL 21 (<i>Weishu</i>)	To resolve fatigue, dampness, tonify SP and ST

pruritic and inflammatory effects of histamine¹⁴ and lowering peripheral blood IgE levels.¹⁵ Patients increasingly seek out complementary alternative medicine for chronic skin conditions because of the limitations of conventional medicine.¹⁶ For example, dapsone is the conventional pharmacologic treatment for DH. Well-documented adverse effects include methemoglobinemia, hemolysis, and anemia.

Although one of the most clearly linked conditions to CD is DH,⁴ a well-known chronic eczematous and pruritic skin disease, not all cases of eczema and urticaria are CD and DH. This particular group of patients can only be identified by their genes and possibly AGA tests. Atypical CD patients do not present with the classic enteropathy usually associated with CD. They present primarily with extraintestinal symptoms like eczema, urticaria, reflux esophagitis, infertility (in both men and women), type 1 diabetes, thyroid disorders, anemias, osteopenia, depression, fatigue, liver diseases, epilepsy, neuropathies, myelopathies, and ataxias.⁴ It has been suggested that the association of CD with such important diseases can only be made if “physicians have a much lower threshold for suspecting CD behind many different clinical syndromes.”⁴

A higher prevalence of CD in patients suffering from reflux esophagitis is being reported. An antibody role against the autonomic nervous system is being suggested as a cause of functional “dysmotility” type dyspepsia—heartburn in which no organic cause can be identified.^{17,18} One of this patient’s primary presenting complaints was acute heartburn that was not being relieved by esomeprazole. Furthermore, the first indication of accidental gluten contamination in this patient is a return of the urticarial eczema and heartburn. This case is also unusual because although the scalp is a commonly involved site for DH, the onset of DH on the scalp is very rare.¹⁹

Results of celiac disease–associated antibody testing, endomysial antibody (EMA) immunoglobulin A (IgA), and AGA index IGA and immunoglobulin G (IGG) were negative in this patient even while she was consuming gluten. These antibodies are most commonly seen in patients with extensive villous atrophy and are less often seen in those with partial or minimal villous atrophy, a common circumstance in DH.⁶ Negative AGA testing result is common with CD-associated HLA-allele variant DQ-8.²⁰ Notable as well, in patients with secretory IgA deficiencies, IgA EMA and IgA AGA test results will be negative; and the serum IgG CD-associated autoantibodies remain very important for the diagnosis of CD.²¹

Further reason to investigate beyond normal IgA EMA and IgA AGA levels is that not only are IgA

deficiencies the most common immunoglobulin deficiency (approximately 1 in 500), but IgA deficiencies are particularly prevalent in patients with autoimmune diseases,²² especially CD.^{7,23} and reliance on IgA-based tests may contribute to the 4.5 to 9 years it takes on average to accurately diagnose adult CD.^{7,24}

Molecular genetic testing is especially useful in patients who were symptomatic but have improved on a GFD. In addition, molecular genetic testing can be particularly helpful in patients who test negative for IgA EMA and IgA AGA; who do not want to undergo a gluten challenge to potentially test positive on a small-bowel biopsy; or whom clinicians suspect may have an atypical or latent form of CD, or an IgA deficiency.

To be diagnosed with CD, one does not have to test positive for the CD-associated antibodies; however, one or both of the CD-associated HLA alleles have to be present.²⁵

This patient tested positive with HLA DQ-8, and the strongest indicator of the presence of DH and CD was the clinical improvement of symptoms (eczema, urticaria, and heartburn) on a GFD. The patient exhibited symptoms consistent with a Western medicine diagnosis of DH and “atypical” CD.

For the patient described in this case, there was a 5-month period between the onset of symptoms and the suspicion of DH and CD. The HLA testing, endoscopy, and colonoscopy were performed after the acupuncture treatments reported in this case study, in March 2009 and January 2010, respectively. During the period before a conclusive diagnosis was reached, acupuncture alleviated some of the patient’s symptoms effectively; acupuncture decreased the hot sensation, degree of redness of the lesions, intense urticaria, headaches, and chronic constipation. It only partly relieved the acute heartburn.

The skin lesions and heartburn did not resolve completely until a GFD was initiated. The definitive DH diagnosis can only be made by taking a skin biopsy 1 cm away from the lesion; the biopsy has to be of normal-appearing skin. Therefore, none of the initial biopsies of the lesions themselves correctly diagnosed DH. In this case, DH was the initial presenting symptom of underlying atypical CD.

Celiac disease–associated HLA allele DQ-8 is commonly associated with minimal small intestine damage,²⁰ negative antibody test results, and negative small bowel biopsy results.⁶ The DQ-8 allele has also been associated with both CD and DH.^{6,20} This case highlights the need for genetic testing for CD when there is clinical reason to suspect that it is the underlying cause of symptoms, even when AGA tests and the small biopsy results are negative and the enteropathic picture is

not that of classic CD. Various forms of CD are being reported in increasing numbers around the world in the literature—typical, atypical or extraintestinal, silent, and latent.²⁶ The associated increased mortality from all forms of the disease makes it an important diagnosis to verify. Celiac disease has also been called the *great imitator*,⁴ exhibiting a “bewildering variety of signs and symptoms.”⁴

Traditional Chinese Medicine diagnosis accurately made the connection between the skin and the digestive system. The solution is a lifelong adherence to a GFD; however, even when committed to this diet and taking dapsone, accidental contamination and subsequent symptomatic exacerbations can occur. It also appeared in this patient that stress exacerbated her DH symptoms, even without known gluten consumption. It appears that acupuncture used in concert with a GFD could play a valuable role in symptom management in patients with DH and CD. Future studies on a larger patient population would be needed to confirm or dispute this assumption.

Limitations

The limitations in this case report are that an accurate perilesional biopsy was never made and, therefore, DH was not diagnosed histologically. It is also not known how much additional benefit, beyond what was noted in the first 12 treatments, the acupuncture would have had without the GFD from treatments 12 through 36. This patient may have improved from the medical treatment or incidentally and not necessarily due to the TCM treatments rendered. Larger studies need to be performed to determine if the treatments used in this case would result in similar results in other groups of patients.

Conclusions

This case demonstrated that the use of acupuncture and a GFD seemed to be helpful for urticaria and severe eczema in a patient with undiagnosed DH and atypical or extraintestinal CD.

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References

- Schmitz J, Garnier-Lengliné H. Celiac disease diagnosis in 2008. *Arch Pediatr* 2008;15(4):456-61.
- Setty M, Hormaza L, Guandalini S. Celiac disease: risk assessment, diagnosis, and monitoring. *Mol Diagn Ther* 2008;12(5):289-98.
- Lang L. Increased risk of death for patients with celiac-related disorders. *Gastroenterology* 2009;137(6):1868.
- Duggan JM. Celiac disease: the great imitator. *Med J Aust* 2004;180(10):524-6.
- Haussmann J, Sekar A. Chronic urticaria: a cutaneous manifestation of celiac disease. *Can J Gastroenterol* 2006;20(4):291-3.
- Nicolas M, Krause P, Gibson L, Murray J. Dermatitis herpetiformis review. *Int J Dermatol* 2003;42:588-600.
- Hopper AD, Hadjivassiliou M, Butt S, Sanders DS. Adult coeliac disease. *BMJ* 2007;335:558.
- Freed, David LJ. Lectins in food: their importance in health and disease. *J Nutr Med* 1991;2(1):45-65.
- Yunis JJ, Ahmed AR. Immunogenetics of dermatitis herpetiformis. *Clin Dermatol* 1991;9:341-6.
- Cordain L, Toohey L, Smith MJ, Hickey MS. Modulation of immune function by dietary lectins in rheumatoid arthritis. *Br J Nutr* 2000;83:207-17.
- Giovanni M. *Diagnosis in Chinese medicine*. London: Churchill Livingstone Elsevier; 2004. p. 183-5.
- Liangyue D, Yijun G, Shuhui H, et al. *Chinese acupuncture and moxibustion*. Foreign Languages Press. Beijing: People's Republic of China; 2007. p. 512.
- Tan EK, Millington GW, Levell NJ. Acupuncture in dermatology: an historical perspective. *Int J Dermatol* 2009;48(6):648-52.
- Pfab F, Huss-Marp J, Gatti A, et al. Influence of acupuncture on type 1 hypersensitivity. *Allergy* 2010;65(7):903-10.
- Gao H, Li XZ, Ye WW, et al. Influence of penetrative needling of Shendao (GV11) on the symptom score and serum IgE content in chronic urticaria patients. *Zhen Ci Yan Jiu* 2009;34(4):272-5.
- Salameh F, Perla D, Solomon M, et al. The effectiveness of combined Chinese herbal medicine and acupuncture in the treatment of atopic dermatitis. *J Altern Complement Med* 2008;14(8):1043-8.
- Keshavarz A, Bashiri H, Ahmadi A, Bazargan-Hejazi S. The prevalence of occult celiac disease among patients with functional dyspepsia: a study from the western region of Iran. *Gastroenterol Res Pract* 2010;2010:170702.

18. Bardella MT, Minoli G, Ravizza D, et al. Increased prevalence of celiac disease in patients with dyspepsia. *Arch Internal Med* 2000;160(10):1489-91.
19. Gol U, Soylu S, Heper AO. An unusual case of dermatitis herpetiformis presenting with initial scalp localization. *Indian J Dermatol Venereol Leprol* 2009;75:620-2.
20. Hadjivassiliou M, Sanders DS, Grünewald RA, Woodroffe N, Boscolo S, Aeschlimann D. Gluten sensitivity: from gut to brain. *Lancet Neurol* 2010;9(3):318-30.
21. Borrelli M, Maglio M, Agnese M, et al. High density of intraepithelial gammadelta lymphocytes and deposits of immunoglobulin (Ig)M anti-tissue transglutaminase antibodies in the jejunum of coeliac patients with IgA deficiency. *Clin Exp Immunol* 2010;160(2):199-206.
22. Burks Jr AW, Steele RW. Selective IgA deficiency. *Ann Allergy* 1986;57(1):3-13.
23. Latiff AH, Kerr MA. The clinical significance of immunoglobulin A deficiency. *Ann Clin Biochem* 2007;44(pt 5):496-7.
24. Dickey W, McConnell JB. How many hospital visits does it take before celiac sprue is diagnosed? *J Clin Gastroenterol* 1996;23(1):21-3.
25. Snyder CL, Young DO, Green PHR, Taylor AK. Celiac disease. *Gene Reviews* 2008. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK1727/>.
26. Cataldo F, Montalto G. Celiac disease in the developing countries: a new and challenging public health problem. *World J Gastroenterol* 2007;13(15):2153-9.