Chronic spontaneous urticaria after BNT162b2 mRNA (Pfizer-BioNTech) vaccination against SARS-CoV-2

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ABSTRACT

Background: *The factors that trigger and exacerbate chronic spontaneous urticaria (CSU) are well known, but it is not unclear whether messenger RNA (mRNA) vaccination against severe acute respiratory syndrome coronavirus 2 can trigger new cases of CSU or a relapse of CSU after long-term remission.*

Objective: *To study the clinical cases of patients with new-onset CSU and CSU in remission who relapsed within 3 months after BNT162b2 mRNA vaccination.*

Methods: *All patients with a CSU diagnosis within 12 weeks of BNT162b2 mRNA vaccination were retrospectively identified and included in the new-onset CSU and the relapsed CSU groups. The first control group (CSU control group) retrospectively consisted of patients diagnosed with CSU in complete clinical remission for ≥ 6 months, with no CSU relapse after vaccination. The second control group (healthy control group) consisted of subjects who were fully vaccinated and without CSU, matched 1:2 for age and sex with patients with CSU.*

Results: *Twenty-seven patients were included in the relapsed CSU group, 32 patients in the new-onset CSU group, 179 patients in the CSU control group, and 476 subjects in the healthy control group. The relapsed CSU and new-onset CSU groups had more allergic comorbidities overall (19 [70.4%] and 13 [40.6%], respectively) than the CSU control group and the healthy control group (50 [27.9%] and 110 [23.1%], respectively; $p < 0.001$). Multiple logistic regression analysis showed that a positive autologous serum skin test result, overall allergic comorbidities, and basopenia were positively associated with the probability of CSU relapse within 3 months after BNT162b2 mRNA vaccination (odds ratio [OR] 5.54 [95% confidence interval {CI}, 2.36–13.02], $p < 0.001$); OR 6.13 [95% CI, 2.52–14.89], $p = 0.001$; and OR 2.81 [95% CI, 1.17–6.72, $p = 0.020$, respectively).*

Conclusion: *It is possible that BNT162b2 mRNA vaccination serves as a provoking and/or relapsing factor of CSU in individuals with allergic diseases and/or predisposed autoimmunity.*

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The factors that exacerbate chronic spontaneous urticaria (CSU) are well known and include stress, medications, hormonal changes, physical stimuli, and infections.[1] Although CSU does not affect the course of coronavirus disease 2019 (COVID-19), exacerbation of CSU occurs in ~30% of patients with COVID-19, with the rate being higher in patients with severe COVID-19.[2] In addition, fear of COVID-19, anxiety, depression, and stress during the COVID-19 pandemic have a significant impact on urticaria activity in patients with mild-to-moderate CSU, even if they are not infected.[3]

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The association between CSU and vaccinations against infections has rarely been reported in the literature.[4] In 2020, the U.S. Food and Drug Administration granted emergency approval for two messenger RNA (mRNA) vaccines to prevent COVID-19 caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Pfizer-BioNTech [New York City, U.S.A.] [BNT162b2] and Moderna [Cambridge, Massachusetts, U.S.A.]).[5] The mRNA vaccine has shown high efficacy in preventing COVID-19, including severe disease, and no serious safety concerns have been identified to date.[5] However, misinformation in the media, religious concerns, and conspiracy beliefs about the safety and allergic adverse effects of COVID-19 vaccines persist.[6] Clinical manifestations associated with histamine release in patients with CSU is perceived as "allergy symptoms" by some individuals and may increase vaccine hesitancy, specifically for COVID-19 vaccination.[7] Because mRNA vaccinations are a new and emerging field, there is limited information on allergic reactions and possible precipitating causes for these reactions.[8]

Adverse skin reactions, which are usually either allergic or delayed hypersensitivity reactions, are among the

possible adverse effects of mRNA vaccines.[9] Recently, Alflen *et al.*[10] reported two cases in which the Moderna COVID-19 vaccine triggered a relapse of CSU that had previously been well controlled with therapy. In the present study, we examined the clinical cases of consecutive patients with new-onset CSU and relapsed CSU within 3 months of BNT162b2 mRNA vaccination against SARS-CoV-2 and compared their clinical and laboratory characteristics with those of patients diagnosed with CSU in remission and patients who were age- and sex-matched BNT162b2 mRNA–vaccinated and without CSU.

METHODS

The study was retrospective and based on the analysis of the data base of patients observed from January 2020 to August 2021 in the secondary allergy outpatient clinics of Leumit Health Services, (LHS), a large nationwide health maintenance organization in Israel that provides services to > 700,000 members. LHS has a comprehensive computerized data base that is constantly updated and includes participant demographics, medical diagnoses, physician visits, hospitalizations, and laboratory tests. The diagnosis of CSU was defined based on a detailed clinical history and classified by using guidelines from European Academy of Allergology and Clinical Immunology (EAACI), the European Union–funded Network of Excellence, Global Allergy and Asthma European Network (GA^2LEN), European Dermatology Forum, and the World Allergy Organization.[11]

Demographic and clinical characteristics were recorded as follows: age and sex, clinical data, atopic comorbidities, and time between BNT162b2 mRNA vaccination and onset of CSU symptoms. Urticaria activity was assessed by using the urticaria activity score (UAS) as described in the 2006 EAACI, GA^2LEN, European Dermatology Forum, World Allergy Organization guidelines[12] for the definition, classification, and diagnosis of urticaria. Blood count with differential, C-reactive protein (CRP), thyroid stimulating hormone (TSH), antinuclear antibodies (ANA), total immunoglobulin E (IgE), and autologous serum skin test (ASST) were tested in all the patients with CSU at the initial visit. In our clinic, we routinely perform a UAS and ASST on all patients with CSU at the initial visit.

The UAS was measured at baseline and at each subsequent visit to assess the response to treatment and was stored in the patients' electronic data base for follow up. The ASST was performed according to the recommendations of the 2009 EAACI/GA^2LEN working group consensus report on ASST for urticaria.[13] The diagnosis codes used in the medical records correspond to the definition of *The International Classification of Diseases, 9th Revision, Clinical Modification* (https://www.cdc.gov/nchs/icd/icd9.htm). All the patients with a documented diagnosis (diagnosis codes 708.1 and 708.9) identified by an allergy specialist in the secondary allergy outpatient clinic at LHS within 12 weeks of BNT162b2 mRNA vaccination were included in the study.

Two control groups were selected. The first control group (CSU control group) retrospectively consisted of consecutive adult patients (ages ≥ 18 years) who presented to our allergy clinic between January 1, 2017, and December 31, 2019, for a new CSU diagnosis but were then in complete clinical remission for at least 6 consecutive months (including during BNT162b2 mRNA vaccination), received two doses of BNT162b2 mRNA vaccine in 2020, and had no single urticaria and/or angioedema events after vaccination. The second control group (healthy control group) consisted of LHS members without a CSU diagnosis who had received the BNT162b2 mRNA vaccine in 2020 and who had not experienced any adverse events such as urticaria and/or angioedema after vaccination. The subjects in this control group were randomly selected and matched for age and sex with all 238 patients with CSU in a 1:2 ratio. Randomization was performed with the software Epi Info 7.2.0.1 (Atlanta, GA) by using simple random sampling.

Patients' diagnoses and laboratory results were recorded with a unique patient identifier, and data were cross-linked accordingly. Data entry was performed by using IBM Cognos 10.1.1 BI Report Studio software (IBM, Armonk, New York, U.S.A.). The results of the queries were downloaded into Microsoft Excel (version 14) (Microsoft , Redmond, Washington, U.S.A.) spreadsheets for analysis. The study protocol was approved by the statutory clinical ethics committee in the LHS and the Medical Center "Shamir" Institutional Review Board (Helsinki Committee) for research that involves human subjects. All the subjects were identified by numbers rather than by their real names. Due to the retrospective nature of the study, informed consent was not required.

Statistical Analyses

A one-way analysis of variance was performed for comparisons between the four study groups. Differences in demographic and clinical characteristics between the subjects of the two groups were analyzed by using the Student *t*-test and the Fisher exact χ^2 test for continuous and categorical variables, respectively, based on the normal distribution and characteristics of the variables. Categorical data are presented as counts and percentages. Data on continuous variables with normal distribution are presented as mean ± standard deviation (SD). We applied multiple imputations for missing data when assuming that data were missing at random, depending on the observed data. Multiple regression analyses,

Table 1 **Demographic and clinical data of study groups**

	Relapsed CSU Group (n = 27)	New-Onset CSU Group (n = 32)	CSU Control Group (n = 179)	Healthy Control Group (n = 476)	p*	p#	p§	p¶
Women, n (%)	18 (66.7)	21 (65.6)	116 (64.8)	309 (64.9)	0.996	0.932	0.849	0.928
Age, mean ± SD, y	40.2 ± 12.4	41.2 ± 11.5	41.7 ± 10.7	41.5 ± 10.8	0.925	0.749	0.507	0.810
Age at CSU onset, mean ± SD, y	35.5 ± 11.4	41.2 ± 11.5	39.4 ± 10.9	—	—	0.062	0.086	0.394
BMI, mean ± SD, kg/m^2	26.3 ± 2.5	26.8 ± 3.1	26.5 ± 2.8	26.7 ± 2.9	0.774	0.504	0.726	0.584
CSU remission, mean ± SD, months	11.70 ± 5.84	—	10.18 ± 3.97	—	—	—	0.085	—
Angioedema, n (%)	13 (48.2)	12 (37.35)	61 (34.1)	—	v	0.409	0.155	0.708
Urticaria activity score (0–6), mean ± SD	4.3 ± 0.8	4.1 ± 0.7	4.1 ± 0.5	—	—	0.310	0.078	0.999
ASST positive result, n (%)	17 (63)	10 (31.3)	42 (32.1)‖	—	—	**0.015**	**<0.001**	0.346
Allergy comorbidities, n (%)								
All	19 (70.4)	13 (40.6)	50 (27.9)	110 (23.1)	**<0.001**	**0.022**	**<0.001**	0.067
Allergic rhinitis	11 (40.7)	7 (31.9)	34 (19)	81 (18.5)	**0.021**	0.458	0.049	0.907
Asthma	5 (18.5)	4 (12.5)	11 (6.1)	19 (4)	**0.003**	0.521	0.025	0.197
Atopic dermatitis	3 (11.1)	2 (6.3)	5 (2.8)	10 (2.1)	**0.028**	0.504	**0.037**	0.314
Total IgE level, mean ± SD, IU/mL	106.3 ± 105.1	108.1 ± 96.8	109.4 ± 89.8	91.3 ± 79.8	0.075	0.946	0.870	0.941
hs-CRP value, mean ± SD, mg/L	4.5 ± 3.6	3.7 ± 3.2	3.8 ± 2.7	2.7 ± 2.4	**<0.001**	0.370	0.852	0.232
Basophils, mean ± SD, $\times 10^3$ cells/mL	0.13 ± 0.10	0.17 ± 0.15	0.19 ± 0.14	0.24 ± 0.15	**<0.001**	0.242	**0.033**	0.462
Basophils, mean ± SD, $<0.1 \times 10^3$ cells/mL	10 (37.1)	7 (21.9)	31 (17.3)	54 (11.3)	**<0.001**	0.200	**0.017**	0.536
Eosinophils, mean ± SD, $\times 10^3$ cells/mL	0.33 ± 0.15	0.31 ± 0.14	0.34 ± 0.15	0.31 ± 0.12	0.065	0.599	0.747	0.294
ANA positivity, n (%)	5 (18.5)	4 (12.5)	12 (6.7)	6 (4)**	**<0.001**	0.521	0.078	0.021
TSH level, mean ± SD	3.4 ± 1.6	2.6 ± 1.3	2.8 ± 1.1	2.3 ± 0.7	**<0.001**	**0.038**	**0.014**	0.358

CSU = Chronic spontaneous urticaria; SD = standard deviation; BMI = body mass index; ASST = autologous serum skin test; IgE = immunoglobulin E; hs-CRP = high-sensitivity C-reactive protein; ANA = anti-nuclear antibody; TSH = thyroid-stimulating hormone.

**Analysis of variance between the study groups.*

#The χ^2 test between relapsed CSU and new CSU groups.

§The χ^2 test between relapsed CSU and control CSU groups.

¶The χ^2 test between new CSU and control CSU groups.

‖A total of 131 subjects of the CSU control group underwent ASST; 42 (32.1%) had a positive ASST result.

***A total of 149 subjects of the healthy control group had ANA tests done; 6 (4%) of them had a positive ANA result.*

The statistically significant p values are present in bold.

adjusted for sex, age, and comorbidity were used to estimate odds ratios (OR) and 95% confidence intervals (CI) for the independent association among BNT162b2 mRNA vaccination, CSU relapse, and new CSU occurrence. All statistical analyses were performed by using the statistical package software (StataCorp, College Station, TX).

RESULTS

The demographic and clinical characteristics of the patients with CSU are shown in Table 1. Twenty-seven patients had a previous CSU diagnosis and were in long-term remission before BNT162b2 mRNA vaccination (relapsed CSU group), 32 patients had new-onset CSU after BNT162b2 mRNA vaccination (new-onset

Table 2 **Multiple logistic regression analysis adjusted for sex, age, and allergic comorbidities**

	For Relapse of CSU after BNT162b2 mRNA Vaccination		For New-Onset CSU after BNT162b2 mRNA Vaccination	
	OR (95% CI)	*p*	OR (95% CI)	*p*
ASST positive result	5.54 (2.36–13.02)	**<0.001**	—	—
Allergic comorbidities				
All	6.13 (2.52–14.89)	**0.001**	1.77 (0.81–3.84)	0.152
Allergic rhinitis	2.23 (0.98–5.07)	0.055	1.19 (0.48–2.99)	0.705
Asthma	2.82 (0.91–8.78)	0.072	2.18 (0.65–7.33)	0.207
Atopic dermatitis	3.60 (0.82–15.88)	0.091	2.32 (0.43–12.51)	0.328
hs-CRP	1.89 (0.52–6.83)	0.331	1.07 (0.34–3.37)	0.901
Basopenia*	2.81 (1.17–6.72)	**0.020**	2.19 (0.90–5.31)	0.083
ANA positivity	2.57 (0.84–7.89)	0.098	1.20 (0.38–3.80)	0.752
TSH	2.82 (0.94–8.31)	0.063	1.24 (0.46–3.29)	0.661

CSU = Chronic spontaneous urticaria; mRNA = messenger RNA; OR = odds ratio; CI = confidence interval; ASST = autologous serum skin test; hs-CRP = high-sensitivity C-reactive protein; ANA–Anti nuclear antibodies; TSH = thyroid-stimulating hormone.
**Defined as blood basophils < 0.1×10^3 cells/mL.*
The statistically significant p values are present in bold.

CSU group), and a group-179 patients with CSU in remission without CSU relapse after vaccination were identified. The control group included 476 age- and sex-matched subjects without CSU who had been fully vaccinated with BNT162b2 mRNA vaccine at least 3 months earlier.

There were no significant differences in sex, age, and body mass index among the three study groups. The relapsed CSU and new-onset CSU groups had more allergic comorbidities overall (19 [70.4%] and 13 [40.6%], respectively) than the CSU control group and the healthy control group (50 [27.9%] and 110 [23.1%], respectively; $p < 0.001$). The relapsed CSU group had a higher proportion of allergic rhinitis (11 [40.7%]), asthma (5 [18.5%]), and atopic dermatitis (3 [11.1%]) than the new-onset CSU group (7 [31.9%], $p = 0.049$; 4 [12.5%], $p = 0.025$; and 2 [6.3%], $p = 0.037$, respectively) (Table 1).

Laboratory Findings

There were more positive ASST results in the relapsed CSU group (17 [63%]) than in the new-onset CSU group (10 [31.3%]; $p = 0.015$) and the CSU control group (42 [32.1%]; $p < 0.001$). More subjects with a positive ANA result (5 [18.5%]) were observed in the relapsed CSU group than in the new-onset CSU group (4 [12.5%]), CSU control group (12 [6.7%]); $p < 0.001$] and the healthy control group (6 [4%]; $p < 0.001$). We also found higher mean ± SD high-sensitivity CRP levels (4.5 ± 3.6 mg/L) in the relapsed CSU group than in the new-onset CSU group (3.7 ± 3.2 mg/L), CSU control group (3.8 ± 2.7 mg/L), and healthy control group (2.7 ± 2.4 mg/L) ($p < 0.001$).

The mean ± SD plasma thyroid-stimulating hormone (TSH) levels were higher in the relapsed CSU group (3.4 ± 1.6 μg/dL) than in the new-onset CSU group (2.6 ± 1.3 mg/L), CSU control group (2.8 ± 1.1 mg/L), and healthy control group (2.3 ± 0.7 mg/L) ($p < 0.001$). The relapsed CSU group was also characterized by having a lower mean ± SD number of basophils in the peripheral blood ($0.13 \pm 0.10 \times 10^3$ cells/mL) than the new-onset CSU group ($0.17 \pm 0.15 \times 10^3$ cells/mL), the CSU control group ($0.19 \pm 0.14 \times 10^3$ cells/mL), and the healthy control group ($0.24 \pm 0.15 \times 10^3$ cells/mL) ($p < 0.001$) (Table 1).

Multiple Logistic Regression Analysis

Multiple logistic regression analysis, adjusted for sex, age, and comorbidities, showed that positive ASST results, overall allergic comorbidities, and basopenia (defined as blood basophils of $<0.1 \times 10^3$ cells/mL) were positively associated with the likelihood of CSU relapse within 3 months of BNT162b2 mRNA vaccination (OR 5.54 [95% CI, 2.36–13.02], $p < 0.001$); OR 6.13 [95% CI, 2.52–14.89], $p = 0.001$; and (OR 2.81 [95% CI, 1.17–6.72], $p = 0.020$, respectively] (Table 2). No statistically significant association was found between the above clinical and laboratory characteristics and the probability of new-onset CSU occurrence within 3 months after BNT162b2 mRNA vaccination (Table 2).

DISCUSSION

In this article, we studied the clinical cases of patients with new-onset CSU and relapsed CSU within 3 months of BNT162b2 mRNA vaccination against SARS-CoV-2

and compared their clinical and laboratory characteristics with those of patients diagnosed with CSU in remission without CSU relapse after BNT162b2 mRNA vaccination and with age- and sex-matched healthy controls who were vaccinated with BNT162b2 mRNA. The study found that positive ASST results, concomitant allergic diseases, and basopenia were positively associated with the likelihood of CSU relapse within 3 months of BNT162b2 mRNA vaccination. However, no statistically significant association was found between the above-mentioned clinical and laboratory features, and the likelihood of new-onset CSU within 3 months of BNT162b2 mRNA vaccination.

Several mechanisms that lead to mast cell activation have been proposed for the pathophysiology of CSU. In patients with CSU, an increased predisposition to mast cell activation is associated with greater surface expression of the Mas-related G protein-coupled receptor X2, which can be activated by various pharmacologic agents.[14] These triggers of CSU are well known and include micro-RNAs, pathogen-associated molecular patterns, complement, chemokines, prostaglandins, autoallergens against interleukin (IL) 24, thyroid peroxidase, and numerous drugs.[15–17] Among pharmacologic agents, nonsteroidal anti-inflammatory drugs, analgesics, antibiotics, and vaccines were the most commonly reported causes of drug-induced urticaria.[18] Tan and Grattan[18] examined the frequency of spontaneously reported drug-induced urticaria from July 1963 to March 2003, taken from the Adverse Drug Reactions Online Information Tracking Reaction Analysis Print data base in the United Kingdom, and found that vaccines were the third most common cause of drug-induced urticaria.

The cause of the development of CSU after vaccination is not clear. It is thought that vaccination induces type I hypersensitivity in some individuals and then acute or chronic spontaneous urticaria develops within days or weeks after vaccination.[18] It is possible that the immunologic response to the vaccine stimulates CSU, possibly by releasing suppressed histamine-releasing autoantibodies or stimulating the production of anti-FcεRIα autoantibodies[19]; however, none of the patients with CSU in our study had a type I IgE-mediated hypersensitivity reaction after inoculation of BNT162b2 mRNA vaccine. Therefore, we cannot claim that a type I hypersensitivity reaction is relevant to the pathophysiology of new-onset CSU or CSU relapse after BNT162b2 mRNA vaccination.

SARS-CoV-2 mRNA immunization induces effector CD4 T cells that secrete T-helper type 1 cytokines (IFN-γ, TNF, IL-2) and CD8 T cells with IFN-γ and IL-2 production, promoting type IV hypersensitivity reactions.[20] Nevertheless, we did not observe manifestations of delayed hypersensitivity reactions in patients with CSU after BNT162b2 mRNA vaccination. None of the patients in the relapsed CSU and new-onset CSU groups had urticaria-like wheals that lasted > 48 hours or other clinical signs of urticarial vasculitis, so no skin biopsies were performed.

Most of our patients with relapsed CSU and new-onset CSU were middle-aged women with a high rate of concomitant allergic diseases. It is consistent with previous studies that atopy, female sex, and third decade of life are risk factors for drug-induced urticaria.[21] Among the factors that increase the risk for adverse reactions to vaccination, genetic predispositions, including atopy, may play some role,[22,23] but this issue may be controversial. First, individuals with atopy seem to be overrepresented among those who have allergic reactions to the COVID-19 mRNA vaccines.[24] Second, a retrospective cohort study recently described a cohort of patients with known atopic disease who received subcutaneous immunotherapy and received at least one dose of Pfizer-BioNTech or Moderna COVID-19 vaccine. The study found that atopy may not be a significant risk factor for an immediate allergic reaction to the mRNA COVID-19 vaccines.[25]

In addition, individuals with recurrent CSU were characterized by having higher rates of ASST and positive ANA results.[26] Although the ASST has only moderate sensitivity for detecting autoreactivity in serum, a positive ASST result is considered a clinical screening test for autoimmune CSU.[26] Basopenia, a positive ANA result, elevated IgG antithyroid peroxidase antibody levels, and low total IgE levels have been recognized as laboratory markers of autoimmune CSU.[27–29] Vaccine-induced autoimmunity due to immune cross-reactivity is well known in individuals who are susceptible.[30] Therefore, we can further speculate that those with relapsed CSU were predisposed to autoimmunity.[31]

Recently, Kolkhir *et al.*[32] described that elevated antithyroid peroxidase antibody levels and low total serum IgE levels, which can be easily and inexpensively determined in routine clinical practice, may better define the autoimmune nature of CSU than of ANA and are associated with resistance to antihistamine treatment. Although we do not have data on antithyroid antibodies in our population, the relapsed CSU group was characterized by a higher proportion of basopenia and a higher rate of positive ANA result than the control groups. Therefore, we can assume that some of our patients with CSU have autoimmune CSU and that they probably have a spectrum of both type I and type IIb autoimmune CSU.

To date, the most commonly used SARS-CoV-2 vaccines are based on mRNA technology that expresses spike protein (SP) antigen.[33,34] Because SP has some similarities to human proteins, this could trigger an autoimmune response after vaccination against SARS-CoV-2.[35] Given the evidence of CSU relapse after remission, it would be prudent to further investigate the

ability of mRNA vaccines to exacerbate CSU. Exogenous mRNA is a characteristic immunostimulatory molecule, and this property of mRNA could prove both beneficial and detrimental in therapeutic use.[36] Theoretically, the possible adverse effects of mRNA vaccination in CSU could be the promotion of endothelial activation, disruption of intercellular junctions and edema, and activation of coagulation and fibrinolysis.[36]

Interestingly, we observed higher high-sensitivity CRP levels in both CSU groups than in the healthy control group. The mRNA and nanoparticles in BNT162b2 mRNA vaccine can activate the pleiotropic innate immune system, including TLR3, TLR7, and TLR8.[37] The induction of innate immune responses may, in addition, contribute to provoke the new-onset CSU and the relapse of CSU.[38] Thus, much remains to be done to clearly evaluate the adverse effects of mRNA-SARS-CoV-2 vaccines in individuals with established or predisposed autoimmunity.[39]

The most important question for further investigation will be whether cross-reactivity between the SP and the human molecules can lead to autoimmune CSU development directly by BNT162b2 mRNA vaccination. Recently, Kanduc and Shoenfeld[40] provided irrefutable evidence for molecular mimicry as a possible mechanism that contributes to SARS-CoV-2–associated autoimmune pathology and cautioned against using the SARS-CoV-2 antigens to prevent stimulation of autoimmune diseases. Further epidemiologic studies should clarify whether a proportion of patients with CSU who have worsened disease severity after recent SARS-CoV-2 vaccination could be misinterpreted by patients and their physicians as having "vaccine allergy" and that could have negative implications for SARS-CoV-2 immunity.[41,42] The strengths of our study include well-characterized patients with new-onset CSU and relapsed CSU after BNT162b2 mRNA vaccination. With regard to limitations, the study design was retrospective, with a small number of patients with relapsed and new-onset CSU. In addition, we did not perform a basophil activation test, IgG anti-FcϵRI/IgE immunoassay, and antithyroid antibodies assessment. In addition, CSU disease activity was measured by the UAS at the first visit rather than by the UAS over 7 days.

CONCLUSION

Our observation should be repeated in other populations to prospectively evaluate the ability of BNT162b2 mRNA vaccine to induce new cases of CSU or to trigger CSU relapse after disease remission.

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