

Evaluation of Itching Sensation in Chronic Urticaria

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ABSTRACT:

BACKGROUND:

Itching is the main symptom in urticaria and can cause a lot of suffering in chronic urticaria.

OBJECTIVE:

To measure the itch threshold in patients with chronic urticaria before and after treatment and compare them with healthy control.

PATIENTS AND METHODS:

The study was conducted at the department of dermatology, medical city teaching hospital Baghdad in the period from December 2009 to July 2010. A total of 30 patients with chronic urticaria (patients group) and 25 healthy individuals (control group), were included in the study.

The age of patients ranged between 21 years and 48 years with a mean of 30.96 years \pm 6.09 years (standard deviation). In control group the age ranged between 20 years and 45 years with a mean of 31.40 years \pm 8.39 years (standard deviation). Regarding gender, in the patients group 19 were females and 11 were males. While in the control group 14 were females and 11 were males. Electrical skin itch threshold was measured by square wave DC electrical stimulator at 13 points on the skin surface in patients and compared to the healthy controls. Doxepin was given to patients for 2 weeks, the itch threshold was then measured again. The severity of urticaria was also assessed before and after treatment.

RESULTS:

Patients with chronic urticaria had significantly lower threshold than the control subjects. The lowest threshold recorded in patients group was (1.292 \pm 0.399) volts in the left cheek, while in control group the lowest electrical cutaneous threshold was recorded in the chin (1.89 \pm 0.490) volts then left cheek (1.910 \pm 0.478). The P-value was significance in all skin spots. The electrical cutaneous threshold increased after treatment in all spots tested after treatment. The increase was statistically significant in all tested the skin spots except in the back of the neck and xyphoid point.

The total score decreased from 10.8 before treatment with doxepin to 1.5 after treatment. The individual parameters also decreased significantly after treatment. There were no significant side effects except drowsiness which improved after a few days even with continuation of treatment.

CONCLUSION:

Electrical skin itch threshold seems to be a simple test that aids in measuring the severity of itching in urticaria and may be used in the evaluation of drugs used for the alleviation of itching in urticaria and other skin diseases.

KEY WORDS: electrical skin threshold, itch, chronic urticaria, doxepin.

INTRODUCTION:

Itching is defined as an unpleasant sensation that leads to a desire to scratch ⁽¹⁾. It is a subjective sensation that is difficult to quantify ⁽²⁾. Itching is an important symptom in many dermatological

diseases ⁽³⁾ and is the main cause of consultation in urticaria ⁽⁴⁾.

Patients with urticaria usually complain of generalized itching even without the appearance of wheals ⁽⁵⁾. Itch threshold has been determined in a number of itchy dermatoses ⁽²⁾. This study was designed to find out whether these patients have a lower threshold to itchy stimuli and whether treatment would correct the reduction in the threshold.

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PATIENTS AND METHODS:

The study was conducted at the Dermatology Department of Baghdad Teaching Hospital in Medical City between December 2009 and July 2011. The study consists of two parts:

1-Measurment of cutaneous electrical threshold in patients with chronic urticaria in different skin spots and comparing it with normal individuals.

2-Measurment of cutaneous electrical threshold after treatment with doxepin HCl for six weeks.

Chronic urticaria was defined as urticaria of more than 6 weeks duration. Patients with chronic urticaria not taking any medication for urticaria or other diseases for at least 3 days were included in the study.

Patients under 18 years of age or above 60 years, patients with diabetes mellitus, hypertension, ischemic heart diseases, renal and liver diseases, were excluded from the study.

A total of 30 patients with chronic urticaria (patients group) and 25 healthy individuals (control group), were included in the study.

The age of patients ranged between 21 years and 48 years with a mean of 30.96 years \pm 6.09 years (standard deviation). In control group the age ranged between 20 years and 45 years with a mean of 31.40 years \pm 8.39 years (standard deviation). Regarding gender, in the patients group 19 were females and 11 were males. While in the control group 14 were females and 11 were males.

Measurement of itching:

A questionnaire form was constructed for the evaluation of pruritus. The severity of urticaria was evaluated according to the following scoring system (adopted from Hamdan et al 2009) (6):

Criteria Score

1-Frequency of attacks:

1-2 days /week	1
3-5 days/week	2
6-7 days/week	3

2-Duration of each attack:

Less than 1 hour	1
2-6 hours	2
More than 6 hours	3

3-Distribution of lesions:

Face and extremities	1
All over the body	2

4-Interference with sleep:

No	0
Yes	1

5- Interference with daily activity:

No	0
Just annoyance	1
Absence from work	2

6-Associated angioedema :

Lips	1
Lips and eyes	2
Lips,eyes and extremities	3

Electrical threshold of itching was measured with the square wave DC electrical stimulator (Palmer-Bss 216 London LTD, made in England). This device can deliver to the skin DC current in waves with controllable pulse width, amplitude (voltage) and frequency. DC current was delivered by two electrodes. The first was an indifferent electrode made of metal a plate measuring (2x2cm), and connected to the negative pole of the device. It was covered with a piece of gauze soaked in normal saline and applied just above the umbilicus. The second electrode was the active one which was connected to the positive pole of the device and consists of an isolated tungsten wire with an exposed free end connected to a small pin applied to the different skin spots to be tested.

After an informed consent, the itch threshold of different spots of skin was determined by using the DC square stimulator. The frequency of the device was set at 20 pulses/ second and the pulse duration at 5 milliseconds. The voltage was increased gradually until the subject feels itching sensation. This voltage was recorded as the itching threshold for that spot. The following spots were selected to cover a wide area of the skin surface; chin, center of forehead, right cheek, left cheek, right arm, left arm, right forearm, left forearm, sternal notch, xyphoid process, back of neck, right leg, left leg.

Drug treatment:

Doxepin HCl (10mg tablet) was given once per day at night for 2 weeks. The severity of the disease was evaluated after 2 weeks of treatment and electrical cutaneous threshold was re-assessed, if the response was not adequate the dose was increased to 20 mg per day and was given for another 2 weeks.

Statistical analysis:

The data for patients with chronic urticaria and control were collected and statistically analyzed

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Compared means of variables between control and patients before treatment was done by using statistical package of SPSS and unpaired t-test. For patients, electrical cutaneous itching threshold and scores of severity of the disease were compared before and after treatment by paired t-test.

RESULTS:

Regarding the age of patients and control, there was no statistical difference between the two groups.

Electrical cutaneous threshold:

Comparison of ECT of 13 skin spots tested in patients with chronic urticaria before treatment, and the control subjects is illustrated in (table 1). Patients with chronic urticaria had significantly lower threshold than the control subjects. The lowest threshold recorded in patients group was (1.292±0.399) volts in the left cheek, while in control group the lowest ECT was recorded in

the chin (1.89±0.490) volts then left cheek (1.910±0.478). The P-Value was significance in all skin spots.

The ECT of different skin spots in patients with chronic urticaria before and after treatment with doxepin is presented in (table 2). The ECT increased after treatment in all spots tested after treatment. The increase was statistically significant in all tested the skin spots except in the back of the neck and xyphoid point.

Scoring of Severity of chronic urticaria before and after treatment with doxepin

The total score decreased from 10.8 before treatment to 1.5 after treatment. The individual parameters also decreased significantly after treatment (table 3). There were no significant side effects except drowsiness which improved after a few days even with continuation of treatment.

Table 1: Electrical itch threshold in patients before treatment and control subjects expressed as mean ± standard deviation in volts with P-value of statistical comparison.

Skin spots	Electrical skin threshold of patients (volts)	Electrical skin threshold of controls (volts)	P-Value
Chin	1.33±0.723	1.89±0.490	0.002
Forehead	1.353±0.625	1.96±0.503	0.0005
Right cheek	1.392±0.39	1.940±0.511	0.0005
Left cheek	1.292±0.399	1.910±0.4781	0.0005
Right upper arm	1.72±0.712	2.32±0.48	0.001
Left upper arm	1.63±0.586	2.32±0.631	0.0005
Right forearm	1.71±0.763	2.22±0.726	0.014
Left forearm	1.575±0.7344	2.250±0.680	0.001
Posterior neck	1.43±0.676	2.38±0.550	0.0005
Sternal notch	1.55±0.705	2.220±0.626	0.001
Xyphoid	1.52±0.722	2.40±0.729	0.0005
Right leg	1.67±0.723	2.62±0.830	0.0005
Left leg	1.69±0.694	2.54±0.900	0.0005

Skin spots	Electrical skin threshold of patients before treatment (volts)	Electrical skin threshold of patients after treatment (volts)	P-Value
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Chin	1.33±0.723	1.533±0.811	0.001
Forehead	1.353±0.625	1.439±0.647	0.037
Right cheek	1.392±0.39	1.467±0.339	0.017
Left cheek	1.292±0.399	1.367±0.414	0.026
Right upper arm	1.72±0.712	1.88±0.916	0.0047
Left upper arm	1.63±0.586	1.783±0.727	0.002
Right forearm	1.71±0.763	1.81±0.811	0.037
Left forearm	1.575±0.7344	1.63±0.718	0.032
Posterior neck	1.43±0.676	1.5±0.785	0.073
Sternal notch	1.55±0.705	1.625±0.706	0.01
Xyphoid	1.52±0.722	1.58±0.717	0.10
Right leg	1.67±0.723	1.83±0.826	0.023
Left leg	1.69±0.694	1.891±0.797	0.001

Table 2: Electrical itch threshold for patients with chronic urticaria before and after treatment with doxepin expressed as mean±standard deviation in volts with P-value of statistical comparison.

Table 3: Severity score of chronic urticaria in all patients before treatment and after doxepin (10-20 mg) for 2 weeks.

	Severity score before treatment	Severity score after treatment	p-value
Frequency of attacks	2.500±0.629	0.233±0.6789	0.0005
Duration of attacks	2.100±0.803	0.4333±0.5683	0.0005
Interference with sleep	1.533±0.860	0.0667±0.365	0.0005
Interference with activity	1.000±0.742	0.667±0.253	0.0005
Extent of lesions	1.8333±0.379	0.4333±0.626	0.0005
Angioedema	1.800±0.924	0.1333±0.507	0.0005
Total	10.800±2.496	1.500±2.583	0.0005

DISCUSSION:

Itchyskin is a state whereby the cutaneous threshold to different itchy stimuli is reduced ⁽⁷⁾. In chronic urticaria this phenomenon is often blamed for itching even in the absence of wheals ⁽⁸⁾. However up to our knowledge and after search of literature no measurement of itch threshold in urticaria was reported.

In the present study itch threshold was found to be significantly lower in patients with chronic urticaria than in healthy controls. This indicates an increased sensitivity of the skin to pruritogenic stimuli even in areas not affected by wheals. These findings can be explained by t

generalized instability of mast cells and their degradation on exposure to minor stimuli (8,9). Drug treatment of urticaria depends mainly on antihistamines ⁽¹⁰⁾. However, in difficult cases especially in chronic urticaria doxepin, an antidepressant with potent histamine1 receptor antagonistic properties is used ^(11,12).

In the present study there was a significant response in all patients after a 2 week course of

doxepin. The urticaria severity index was reduced. In parallel with this reduction, the skin critical threshold was elevated at all tested

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sites which indicates a generalized reduction in the heightened state of response to itchy stimuli. This contributes to the relief in such patients in addition to clearing wheals.

CONCLUSION:

electrical skin itch threshold seems to be a simple test that aids in measuring the severity of itching in urticaria and may be used in the evaluation of drugs used for the alleviation of itching in urticaria.

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