

## URTICARIA CALORICA

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## Summary

Fourteen cases of urticaria calorica, comprising 0.7% of total skin out-patient attendance and 8.6% of total urticaria cases were seen during a period of eight months. Exercise test produced micropapular urticarial lesions in 100% cases and this is considered to be the most convenient and easy method of detection. Persistence of erythema at the site, 10 minutes after application of heat, has also been found to be diagnostic. Wheal and Erythema due to intradermal injection of carbachol was significantly more as compared to normal individuals. No case of local heat urticaria was seen.

Urticaria Calorica (Cholinergic urticaria or micropapular urticaria) is encountered in dermatological practice not infrequently. Described by Duke<sup>1</sup> in 1924, it has subsequently been reported by several workers<sup>2,3,4,5</sup>. Lesions of cholinergic urticaria characteristically are small wheals, 2-4 mm in diameter, located around hair follicles<sup>6,7</sup> with or without erythematous flare<sup>3</sup>. Systemic manifestations like abdominal pain, diarrhoea, cramps, faintness, flushing and salivation have also been reported in association with urticarial attacks<sup>8</sup>. In susceptible persons, cholinergic urticaria can be produced by an injection of acetylcholine or one of its derivatives<sup>6</sup> or can be precipitated by heat, physical exertion and emotional upsets<sup>1,2,7</sup>.

## Material and Methods

Out of 163 cases of urticaria of varying etiology, from a total of 18,761 pati-

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ents of skin out-patient department during a period of eight months, all those who associated their urticarial attacks with exercise, exposure to hot environment, sudden agitation, hot drinks or hot water bath were selected for study. They were also interrogated for symptoms like abdominal pain, diarrhoea, cramps, faintness, flushing or salivation in association with urticarial attacks.

Following investigations were carried out in all of them:—

- I. *Blood* — Hb, TLC, DLC, ESR.
- II. *Urine* — Routine and microscopic examination.
- III. *Stool* — Specially for any ova or cysts.

IV. *Local Heat Test* — A standard exposure at 50°C for a duration of two minutes was given on the volar surface of forearm of the patients, using the device designed by Pasricha et al<sup>9</sup>. After a lapse of 10 minutes, erythema and whealing associated with any itching or burning that developed at the site of contact and beyond, as well as urticarial lesions appearing on other parts of the body, with or without any systemic symptom, were noted.

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TABLE 1

Tests	Wheal	Erythema	
Intradermal Histamine Test	Range {	Mean 1.46	6.26
		Max. 5.7 sq. cm.	18.8 sq. cm.
		Min. 0.0 sq. cm.	0.0 sq. cm.
Intradermal Carbachol Test	Range {	Mean 0.46	2.81
		Max. 3.0 sq. cm.	13.5 sq. cm.
		Min. 0.0 sq. cm.	0.0 sq. cm.
Local Heat Test	Uniformly negative	Present at site of contact in 17 cases	

Mean and Range of Intradermal Histamine and Carbachol Tests and Local Heat Test in 60 normal individuals.

V. *Exercise Test* — The patients were subjected to exercise for 10 minutes and were observed for the development of urticaria and systemic symptoms.

VI. *Hot Water Immersion Test* — The hand well above the wrist was immersed in hot water whose temperature was maintained at 45°C, for five minutes. After a lapse of 10 minutes, any erythema and urticarial lesion developing on the immersed portion of the limb and beyond, with or without systemic symptoms, were noted.

VII. *Exposure to hot Environments* — The patients were made to sit in front of radiators, approximately at a distance of three feet or made to stand in hot summer sun for 10 minutes or till they complained of itching and restlessness. After this period of exposure they were observed for the development of urticaria and systemic symptoms.

VIII. *Intradermal Histamine and Carbachol Test* — 0.1 ml of 0.25 mg./ml of carbachol and 0.1 ml of 1 mg./ml of histamine were injected intradermally using a tuberculin syringe at two different sites on the flexure surface of forearm and reaction produced by each was noted after 10 minutes. Intradermal injection of normal saline (0.1 ml) on the opposite forearm served as control.

Local heat test and intradermal histamine and carbachol tests were done in sixty normal subjects to serve as controls.

**Observation**

The results of various tests performed on 60 normal persons and those performed on the 14 cases of urticaria calorica are shown in Table 1 and 2 respectively.

With Histamine Test, average size of wheal in cases of urticaria calorica was found to be 2.02 sq. cms. (range: 0.4 to 5.5 sq. cms.) as against an average of 1.46 sq. cms. (Range: 0.0 to 5.7 sq. cms.) in case of normals. Statistically the value of 't' was found to be 1.27 which is not significant at 5% level of significance as per details in Table 3.

TABLE 3

Intradermal tests	Calculated value of 't'	Conclusion
Histamine wheal comparison	1.27	Not significant
Histamine Erythema comparison	3.47	Significant
Carbachol Wheal comparison	4.22	Significant
Carbachol Erythema comparison	3.20	Significant

Table showing calculated values of 't' and their significance for Intradermal Histamine and Carbachol tests in comparison to Normal controls. The 5% value of 't' for 70 degree freedom is 1.994.

TABLE 2

No.	Age in years & Sex	Duration of Illness	Histamine Test		Carbachol Test		Local Heat Test		Exercise Test	Heat Tests		Dermographism	
			Wheal in sq. cm.	Erythema in sq. cm.	Wheal in sq. cm.	Erythema in sq. cm.	Wheal	Erythema		Exposure to hot Environment	Wheal		Hot Water immersion test
1.	22 M	10 yrs	0.4	9.0	0.0	3.0	-ve	++	Micropapular Urticaria	Micropapular Urticaria	-ve	++ with Micro-papular Urticaria	Neg.
2.	24 M	4 yrs	5.5	27.3	1.8	8.8	-ve	+	Micropapular Urticaria	Neg.	-ve	+	Pos.
3.	21 M	1 yr	1.4	20.4	1.0	4.2	-ve	+	-do-	Neg.	-ve	+	Neg.
4.	24 M	1 yr	2.2	45.5	0.25	9.0	-ve	++	-do-	Neg.	-ve	++	Neg.
5.	20 M	4 yrs	0.7	2.5	0.8	2.2	-ve	+	-do-	Neg.	-ve	+	Neg.
6.	40 F	13 yrs	4.2	12.0	1.5	6.7	-ve	+	-do-	Neg.	-ve	+	Neg.
7.	17 F	6 months	0.5	1.0	1.2	3.9	-ve	++ with Micro-papular urticaria around	++ with Micro-papular urticaria around	Micropapular Urticaria	-ve	++ with Micro-papular Urticaria	Neg.
8.	20 F	3 months	2.5	14.7	1.0	18.2	-ve	++	-do-	Micropapular Urticaria	-ve	++ with Micro-papular Urticaria	Neg.
9.	32 M	4 yrs	1.5	3.1	2.4	4.4	-ve	+	-do-	Neg.	-ve	+	Neg.
10.	18 M	3 months	1.5	23.7	1.5	1.8	-ve	++	-do-	Neg.	-ve	++	Neg.
11.	20 M	4 yrs	2.1	7.7	0.3	2.4	-ve	++	-do-	Neg.	-ve	++ with Micro-papular Urticaria	Neg.
12.	17 M	4 months	1.8	5.0	1.0	6.4	-ve	++	-do-	Neg.	-ve	++	Neg.
13.	22 M	10 days	3.0	11.0	1.0	1.0	-ve	+	-do-	Neg.	-ve	+	Neg.
14.	22 M	3 weeks	1.0	5.8	1.6	10.8	-ve	+	-do-	Neg.	-ve	+	Neg.

Mean : 2.02 13.48 1.10 5.91  
 Range : Max. 5.5 45.5 2.4 18.2  
 Min. 0.4 1.0 0.0 1.0

Key : + = Erythema or Whealing at Site  
 ++ = Erythema or whealing beyond the area of contact of heat

Duration of illness, age and Sex distribution and results of various tests in 14 cases of cholinergic urticaria

The mean value of Histamine Erythema in cases of Urticaria Calorica measured 13.48 sq. cms. (Range: 1.0 to 45.5 sq. cms.) as compared to 6.26 (Range: 0 to 18.8 sq. cms.) in the cases of normals. Such a difference has been found to be statistically significant with value of 't' at 3.47.

The mean value of wheal observed with Carbachol test in cases of urticaria calorica was observed to be 1.10 sq. cms. (Range: 0.0 to 2.4 sq. cms.) whereas in cases of normals it was found to be 0.46 sq. cms. (Range: 0.0 to 3.0 sq. cms.) This difference in mean is significant as the value of 't' has been calculated to be 4.22 as against the value of 't' to be 1.994 for 70 degree of freedom. The mean for Carbachol Erythema in 14 cases of Urticaria Calorica has been observed to be 5.91 (Range: 1.0 to 18.2. sq. cms.) as against 2.81 (Range: 0.0 to 13.5 sq. cms.) in the case of controls and this again has been observed to be 3.2 as against the value of 't' for 70 degree of freedom which is 1.994 at 5% level of significance.

When local heat test and Hot water immersion tests were carried out, it was observed that wheal at the site of contact was negative both in the patients suffering from the disease as well as in the control group. Erythematous response to local heat and Hot water immersion tests was observed at the site in all the cases and even beyond the site of contact in seven out of fourteen. Out of these seven cases, one showed micropapular urticaria around the erythematous zone and four cases developed micropapular urticaria on different parts of body with local heat test and hot water immersion test respectively. In the control group, erythema at the site alone was noticed only in 17 out of 60 cases. Viewed statistically  $\mu^2$  value was found to be 20.4 as against 3.84 for one degree of freedom at 5% level of significance. Hence it is con-

cluded that erythema at site or beyond the local application of heat at the end of 10 minutes is characteristic of urticaria calorica cases.

In all the 14 cases, physical exertion induced micropapular urticarial attacks. Solar heat, heat from fire and hot water bath precipitated urticaria in two cases (14.3%) only. Dermographism was negative in all except a single case.

Blood (Hb %, TLC, DLC and ESR), urine and stool examination results were within normal limits.

Maximum number of cases, 12 (85.7%) belonged to the age group 17-24 years. The male and female ratio was 3:6:1. As reported earlier by Kierland<sup>8</sup> and Sack<sup>10</sup>, most cases showed worsening of symptoms, paradoxically, during winter months. In no case, emotional upset and hot drinks precipitated urticarial response. During attack, itching, erythema and micropapular urticarial wheals, both follicular and nonfollicular, distributed mostly around neck, upper trunk and upper extremities were prominent features. None had systemic manifestations of cholinergic urticaria. Except in one case, whose younger brother was also suffering from micropapular urticaria, there was no family history or any other allergic manifestation in the family.

#### Comments

Fourteen cases of cholinergic urticaria formed 0.7% of the total skin O. P. D. attendance and 8.6% of total urticaria cases.

The maximum number of cases, 12 (85.7%) belonged to the age group 17-24 years and this compares well with the highest age incidence reported by Sarojini<sup>5</sup>. This may be attributed to more chances of exposure of these young subjects in this age group, to physical exertion and out-door activities.

Amongst the various heat tests performed, local heat, hot water immersion and exercise tests gave positive results in all the cases and are thus of great diagnostic value. Persistence of erythema at the site, 10 minutes after local application of heat, is diagnostic. But as exercise test produced micropapular urticaria in all cases, and being simple, this is considered to be the most convenient and easy method of detecting such cases. Though, both histamine and carbachol tests were positive to variable degrees, the latter was statistically more significant.

Not a single case of local heat urticaria was seen, as none showed whealing at the site of application of heat.

None of the cases in the present series benefited from antihistaminics or hydroxyzine. Beneficial effect was brought about only by avoiding exertional episodes and hot environments.

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