

# Acute Urticaria in Children in a Tertiary Care Hospital: A Cross-sectional Study

KANNU PRIYA<sup>1</sup>, ANUPAMA VINAYAK MAUSKAR<sup>2</sup>

## ABSTRACT

**Introduction:** Urticaria is a highly prevalent condition resulting in a large number of medical consultancies worldwide. Urticaria is derived from the Latin word “urere” meaning “to burn”. Urticaria usually manifests as a transient, itchy, polymorphic skin eruption. It can occur in any age group.

**Aim:** To study the prevalence and possible triggers of acute urticaria in children.

**Materials and Methods:** All children of age group six months to 12 years visiting the Institute from June 2018 to April 2019, with the complaint of acute urticaria with or without angioedema were included in the study while those with chronic urticaria and only angioedema were excluded. Sixty five children presented with acute urticaria with or without angioedema. Patients were diagnosed based on history and clinical examination. All patients were subjected to a detailed history, general physical examination and, necessary investigations like Complete Blood Count (CBC),

absolute eosinophil count, Erythrocyte Sedimentation Rate (ESR), C-reactive Protein (CRP), Skin Prick test as indicated. They received appropriate treatment and their clinical outcome was studied.

**Results:** Prevalence of acute urticaria was found to be 0.23. It was more commonly seen in males (63.08%) and more in the age group of 1 to 5 years (56.92%). The focus of infection was found in 44.6% of children, while 21% of children had a history of consumption of some form of medications leading to urticaria.

**Conclusion:** Urticaria can be prevented in children by preventing them from infection and avoiding the use of amoxicillin-clavulanic acid unless very necessary. Those children with a family history of acute urticaria should be prevented from exposure to excessive heat, cold, pressure, vibration, etc. Investigations are also recommended as an important diagnostic tool to find out the aetiology of acute urticaria.

## INTRODUCTION

Urticaria is also known as hives, wheals or, nettle rash. Urticaria usually presents with intensely pruritic wheals, occasionally with oedema of the subcutaneous interstitial tissue [1]. It has a prevalence of about 20% [1]. In a recent population-based German birth cohort study, the incidence of urticaria was approximately 1% per year of age and the cumulative prevalence of urticaria in children at age of 10 years was 14.5% for boys and 16.2% for girls [2]. Urticaria usually involves superficial layers of the dermis [3]. Urticaria may be acute that is a disease resolving in less than six weeks or chronic that is a continuous disease lasting for six weeks or more [4].

Histamines are the principle mediator of urticaria and angioedema [5]. The mast cell is the major effector in all forms of urticaria and angioedema [5]. It can also result from non Immunoglobulin E (IgE) mediated stimulation of mast cells caused by radio-contrast agents, viral agents, opiates, and Non Steroidal Anti-inflammatory Drugs (NSAIDs) [4]. The acute form of urticaria is a self-limited process [4]. Systemically absorbed allergens that can induce generalised urticaria include; food, drugs and, stinging insect venom [5].

The aim and objective of this study were to find out the prevalence of acute urticaria, clinical profile and, aetiological factors responsible for acute urticaria in children.

## MATERIALS AND METHODS

A cross-sectional study was undertaken in the Medical College Hospital of Mumbai, Maharashtra, India from a period of June 2018 to April 2019, after taking the Institutional Ethical Committee approval of HOT Medical College and Dr. R.N. Cooper Hospital, Mumbai, Maharashtra, India. Informed consent was obtained from parents and guardians before the study.

**Inclusion criteria:** All children of age group six months to 12 years who attended Out Patient Department (OPD) or admitted in Paediatric

**Keywords:** Angioedema, Itching, Viral infections

ward with complaints of acute polymorphic, itchy eruptions with or without bilateral pedal oedema, periorbital puffiness and, swelling on lips, during this period were included in the study.

**Exclusion criteria:** Children with chronic urticaria and angioedema were excluded.

**Sample size calculation:** The sample size was estimated based on the prevalence of acute urticaria in children from the previous study [5]. The total sample size calculated was equal to or greater than 235 for a precision of 2% and a confidence interval of 95% (power of 80%). A total of 65 children were enrolled in the study:

The step for calculation of sample size was as follows:

$$n = \frac{Z^2 p (1-p)}{d^2}$$

Where,

n is the sample size

z=z statistic for 95% confidence interval

p=expected prevalence

d=precision

All patients were subjected to a detailed history and general physical examination, CBC with differential analysis, absolute eosinophil count, ESR, urine and, stool examination. They received appropriate treatment and their clinical outcome were studied.

## STATISTICAL ANALYSIS

A predesigned proforma was used to collect the data. Data collected was entered in Microsoft Excel sheet. Data, mean and standard deviation of quantitative variables are represented in tables. Appropriate statistical tests are applied using EpiInfo version 7.2 and Statistical Package for the Social Sciences (SPSS) software version 20 for analysis. Chi-square test was used for association

wherever applicable. A p-value <0.05 was considered as statistically significant.

## RESULTS

The total number of children attending the OPD during 11 months was 26,321. While the total number of children admitted to the paediatric ward during this period was 2,547 (total patients 28,868). Among them, 65 children presented with acute itchy polymorphic eruptions with or without angioedema. The prevalence of acute urticaria calculated was 0.23 [Table/Fig-1].

Variables	Number	Prevalence
Acute Urticaria with or without angioedema	65	0.23
Acute Urticaria alone	45	0.16
Angioedema with urticaria	20	0.07

[Table/Fig-1]: Prevalence of children with acute urticaria.

Acute urticaria in the present study was found to be more common in males, the calculated number of male children was 41 and the calculated percentage was 63.08%. In six months to one year, seven children had acute urticaria (10.77%); more than one year to five years, 37 children had acute urticaria (56.92%) and more than five years to 12 years, 21 children had acute urticaria (32.31%).

Further, the study results suggested that wheals erupted more commonly during the night, seen in 29 children (44.68%) and a maximum of 46 (70.77% of total children) recovered in 1-3 days. The maximum number of days taken to recover was 10, seen in only three children (4.62% of all children).

About 37 children (56.92%) of all had a fever as the primary chief complaint, which was followed by urticarial rashes. Of them, 29 children (44.61%) had a focus of infection.

About 41.37% of children had Upper Respiratory Tract Infection (URTI) with raised leukocyte counts, 6.90% had a pneumonic patch on chest X-ray, 20.69% had acute gastroenteritis with leucocytosis [Table/Fig-2].

Infection	Number	Percentage
URTI	12	41.37
Pneumonia	2	6.90
Viral fever	5	17.24
Septicaemia	1	3.45
Acute gastroenteritis	6	20.69
Worm infestation	2	6.90
Herpes labialis	1	3.45
Total	29	100

[Table/Fig-2]: Infection associated acute urticaria.

About 21.5% of children developed wheals following six hours of consumption of some form of medications. Out of these, 42.87% of children had wheals following consumption of amoxicillin-clavulanic acid. While in 7.14% of children medication was taken in the powdered form provided by the local practitioner which remains unknown [Table/Fig-3].

Drugs	Number	Percentage
Amoxicillin- clavulanic acid	6	42.87
Dicyclomine	4	28.57
NSAIDS (Ibuprofen)	1	7.14
Ofloxacin	1	7.14
Cefopodoxime	1	7.14
Unknown medication	1	7.14
Total	14	100

[Table/Fig-3]: Drug-induced acute urticaria.

Other causes of acute urticaria were Measles-Rubella (MR) vaccination, watermelon ingestion, ant bite, mosquito bite and, unknown insect

sting (one each). A family history of acute urticaria was present in 5 children (7.69%). Four children (6.15%) had a history of atopy while in 12 children (18.46%) cause remained idiopathic.

Three children (4.62%) had anaemia with Haemoglobin (Hb) between 7-8 gm/dL. Total leukocyte counts were raised in 12 children (18.46%). About 5 children (7.69%) had lymphocytosis, suggestive of viral infection. The ESR was raised in only one child. The maximum fall was 35 suggesting infective aetiology. Stool examination detected parasitic worm infection in 2 children (3.08%). Ova and cyst of *Enterobius vermicularis* were isolated [Table/Fig-4].

Investigations	Number	Percentage (from all 65)
Anaemia	3	4.62
Leukocytosis	12	18.46
Lymphocytosis	5	7.69
Leukopenia	1	1.54
Eosinophilia	4	6.15
Raised ESR	1	1.54
Stool- parasites	2	3.08

[Table/Fig-4]: Investigations.

The majority of the patients, 54 (83.08%) got cured. Ten patients (15.38%) had recurrent urticaria while 1 patient (1.54%) died of a cause other than urticaria.

Only 64 patients for associations of different study are used and one patient who died, diagnosed with septic arthritis with septicaemia with multiorgan dysfunction was excluded.

No significant association was found between age group and outcome, sex and outcome [Table/Fig-5,6] and time of appearance of rash and outcome and duration of rash and outcome, and angioedema and outcome [Table/Fig-7-9].

Variables		Age groups			Total
		6 months-1 year	1-5 years	5-12 years	
Outcome	Cured	6	30	18	54
	Recurrent	1	6	3	10
Total			36	21	64

[Table/Fig-5]: Age groups and outcome.

$\chi^2=0.07$ ;  $p=0.97$ ; Not significant; A Chi-square test was used

Variables		Sex		Total
		F	M	
Outcome	Cured	21	33	54
	Recurrent	2	8	10
Total		23	41	64

[Table/Fig-6]: Sex and outcome.

$\chi^2=1.31$ ;  $p=0.25$ ; Not significant; A Chi-square test was used

Variables		Time of appearance				Total
		Afternoon	Evening	Morning	Night	
Outcome	Cured	14	3	12	25	54
	Recurrent	4	0	2	4	10
Total		18	3	14	29	64

[Table/Fig-7]: Time of the appearance of urticarial rash and outcome.

$\chi^2=1.24$ ;  $p=0.74$ ; Not significant; A Chi-square test was used

Variables		Duration				Total
		<1 day	1-3 days	4-5 days	6-10 days	
Outcome	Cured	6	37	8	3	54
	Recurrent	1	9	0	0	10
Total		7	46	8	3	64

[Table/Fig-8]: Duration of urticaria and outcome.

$\chi^2=2.59$ ;  $p=0.46$ ; Not significant; A Chi-square test was used

Variables		Angioedema		Total
		Absent	Present	
Outcome	Cured	36	18	54
	Recurrent	9	1	10
Total		45	19	64

**[Table/Fig-9]:** Angioedema and outcome.  
 $\chi^2=2.20$ ;  $p=0.14$ ; Not significant; A Chi-square test was used

A significant association was seen between fever with urticarial rash and outcome ( $p=0.001$ ), drug reaction and outcome ( $p=0.006$ ), age groups of the patients and aetiology ( $p=0.03$ ), aetiology and outcome ( $p<0.001$ ) [Table/Fig-10-13].

Variables		Fever		Total
		Absent	Present	
Outcome	Cured	19	35	54
	Recurrent	9	1	10
Total		28	36	64

**[Table/Fig-10]:** Fever and outcome.  
 $\chi^2=10.30$ ;  $p=0.001^*$ ; \*Significant; A Chi-square test was used

Variables		Drug reactions		Total
		No	Yes	
Outcome	Cured	40	14	54
	Recurrent	10	0	10
Total		50	14	64

**[Table/Fig-11]:** Drug reactions and outcome.  
 $\chi^2=7.59$ ;  $p\text{-value}=0.1^*$ ; \*not significant; A chi-square test was used

Variables	6 months to 1 year	1-5 years	5-12 years	Total
Atopy	0	1	3	4
Drug-induced	4	4	6	14
Idiopathic	0	11	1	12
Infective	2	18	9	29
Others	1	3	2	6
Total	7	37	21	65

**[Table/Fig-12]:** Age groups and aetiology.  
 $\chi^2=16.75$ ;  $p=0.03$ ; \*Significant; A Chi-square test was used

Variables	Cured	Recurrence	Total
Atopy	2	2	4
Drug-induced	14	0	14
Idiopathic	6	6	12
Infective	28	0	28
Others	4	2	6
Total	54	10	64

**[Table/Fig-13]:** Aetiology and outcome in the form of cured or recurrence.  
 $\chi^2=23.55$ ;  $p<0.001$ ; \*Significant; A Chi-square test was used

## DISCUSSION

The prevalence of acute urticaria with or without angioedema was found to be 0.23, while the prevalence of acute urticaria alone was 0.16. Urticaria was found to be more common in males than females and more common in the age group of 1-5 years. Rashes were more common at night, mostly due to histamine release that occurs at night.

The prevalence of urticaria has been reported to be 2.1-6.7% in children and adolescents [5]. The prevalence in the present study was found to be 0.23 and the male to female ratio observed was 1.7:1. The male to female ratio observed in a study by Liu TH et al., was 1.28 and in a study by T Aoki et al., male to female ratio of 1.6:1 [6,7].

The mean age in the present study was  $4.78\pm3.34$  years. Liu TH et al., [6] observed the mean age of  $4.92\pm3.71$  years similar to the

index study. Mortureux P et al., reported a mean age of 1.9 years, less than the present study [8]. Many studies observed that the infections were the major aetiology of the urticarial rashes [8-13]. Huang S, reported that the infections were the common aetiology for acute urticaria [14]. Godse K et al., in his study mentioned that drug hypersensitivity, is the second most common cause of childhood acute urticaria similar to our study [15]. Greenberg RN et al., study found five children had urticarial rashes following vaccination [16]. The present study reported only one child who developed urticaria following MR vaccination. Around 9.23% had a history of rash after insect bites. Liu TH et al., had a total of 1.5% cases of rash after an insect bite. Around 6.15% of children in the present study had a history of atopy [6]. Del Pozzo-Magaña BR in his study mentioned that history of atopy or other allergic diseases can be present in up to 40% of children with urticaria [17]. In 18.46% cases, urticaria was idiopathic. A case-control study by Plumb J et al., observed that no cause was identified for 54% of the patients [13]. In the present study, 1.54% had a history of consumption of watermelon leading to urticaria. In Thailand, Tuchinda M et al., reported that food is a possible cause of urticaria in 9.9% of paediatric patients under 12 years [18]. In our study, 90% of the recurrent cases had no fever, while 64.84% of cured cases had a fever. A significant association was seen between fever and urticarial rash ( $p=0.001$ ). In a study by Mortureux P et al., fever was present in 50% of cases, mostly mild (temperature,  $38^\circ\text{C}$ ) [8]. In 44.62% of children rashes first appeared during the night similar to the study done by Kauppinen K et al., in which 52% rash appeared at night [19].

## Limitation(s)

The above results do not depict the actual prevalence of acute urticaria within the community, because as it is a self-resolving condition and many parents fail to visit the hospital unless and until it is very annoying.

## CONCLUSION(S)

Prevention from infection can prevent urticaria in children. This study also recommends avoiding the use of amoxicillin-clavulanic acid unless very necessary, as it is proven to be a common cause of drug-induced acute urticaria in children. Those children with a family history of acute urticaria should be prevented from exposure to excessive heat, cold, pressure, vibration, etc. We also recommend investigations as an important diagnostic tool to find out the aetiology of acute urticaria.

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**PARTICULARS OF CONTRIBUTORS:**

1. Senior Registrar, Department of Paediatrics, H.B.T Medical College and R.N Cooper Hospital, Bhagalpur, Bihar, India.
2. Professor and Head, Department of Paediatrics, H.B.T Medical College and R.N Cooper Hospital, Mumbai, Maharashtra, India.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**

Kannu Priya,  
D/O Dr. Kailash Chaudhary, Flat No. 301, Jaiswal Tower, Gumti No. 3, Bhikhanpur,  
Bhagalpur, Bihar, India.  
E-mail: shilpi.priya0310@gmail.com

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