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Original Research Article

Serum IgE and absolute eosinophil count-A valuable serological markers in childhood urticaria

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ABSTRACT

Background: Urticaria is the most common skin disorder in children presenting to the paediatric department. Sometimes it can also present with angioedema which is an emergency condition requiring immediate treatment. Hence this study signifies the importance of Absolute eosinophil count and serum IgE in childhood urticaria and its correlation with disease severity and management.
Objectives: To analyse the Absolute eosinophil count and serum IgE in children with urticaria from age group of 1-12 years and its correlation with disease severity.
Materials and Materials: An observational study on 49 children with urticaria and measurement of Absolute eosinophil count and serum IgE and categorised based on urticaria activity score.
Results: Most common age group affected was 5-12 years and mean age was 6.75±3.47. Out of 49 children, 97.95% of the affected children have raised serum IgE levels, 39% of the affected children have raised Absolute Eosinophil Count. There was also increase in serum IgE levels with increase in AEC levels were found.
Conclusion: The disease severity increases with increasing levels of absolute eosinophil count and serum IgE in children with urticaria. Hence this study suggests that absolute eosinophil count and serum IgE should be regareded as a valuable markers in childhood urticaria.

1. Introduction

Urticaria also known as hives is a transient condition of the skin which is usually caused by immunological IgE mediated mast cell degranulation releasing histamine and other inflammatory mediators which is responsible for the development of erythematous pruritic wheals all over the body. A wheal is described by a circumscribed superficial raised lesion that usually blanches on pressure and associated with intense itching or burning sensation.[1] In urticaria, wheals occurs within minutes and it is transient in nature as the skin returns to its normal appearance within 1–24 hours. In children the prevalence of urticaria ranges from 15.3 to 22.5%.[2] Urticaria can be classified as acute and chronic depending upon the duration of the disease. If urticaria presents for less than 6 weeks it is acute and those that presents for more than 6 weeks are termed as chronic.[3]

According to literature only paucity of studies were available about absolute eosinophil count and serum IgE and its correlation with the disease severity in children with urticaria. Hence this observational study has been attempted to know the significance of correlation among absolute eosinophil count and serum IgE levels with disease severity in children with urticaria.

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2. Materials and Methods

2.1. Study design

A cross sectional observational study was conducted in 49 children with urticaria for a period of 2 years in the Pediatric department of a teaching Government medical college, Cuddalore, Tamil Nadu, India. The study had been approved by Ethical Committee for Human Research. Consent was obtained from the care takers.

2.2. Inclusion criteria

Children with Urticaria aged 1 – 12 years.

2.3. Exclusion criteria

1. Non-urticarial rash.
2. Viral exanthema.
3. Immunodeficiency children.
4. On chemotherapy.
5. Long term steroid therapy.

2.4. Methods

After obtaining informed consent from the care takers, children who meet the inclusion criteria were enrolled in the study. History regarding the course of disease, trigger factors and risk factors were noted. Depending on the number of wheals and itching, the study population were graded as mild (0-2), moderate (3-4) and severe (5-6) based to urticaria activity score[4] calculated over 24 hours.

1. Absolute eosinophil count were obtained by haematological analyser, where AEC levels less than 500 cells/ cu.mm was considered as normal.[5]
2. Sera were separated by centrifugation and analysed for serum IgE levels in all children with urticaria through immunoassay using immunocap 250 systems. Normal serum IgE levels for age were given in Table 1.

3. Results

A total of 49 children of which 39 % belongs to age group of 1 - 5 years, 61% belongs to age group of >5-12 years with mean age of the study population was 6.75±3.47. Among them 57% were males and 43% were females. 55% of the affected children belongs to mild urticaria and 38% belongs to moderate urticaria based on urticaria activity score depicted in Figure 1. The mean serum IgE level was 1046±1131.3 and mean AEC level was 543.98±27. Almost 98% of the children with urticaria have raised serum IgE levels shown in Figure 2. About 39% of the children have raised absolute eosinophil count depicted in Figure 3. There was a significant correlation between serum IgE with disease severity with p value 0.028 and also AEC with disease severity with significant p value 0.046 given in table 2,3 respectively. Thus, the disease severity is directly proportional to AEC and serum IgE levels. We also found that there was significant correlation between AEC and serum IgE with p value 0.0019 given inTable 4. Thus, it indicates that the AEC levels are directly proportional to serum IgE levels.

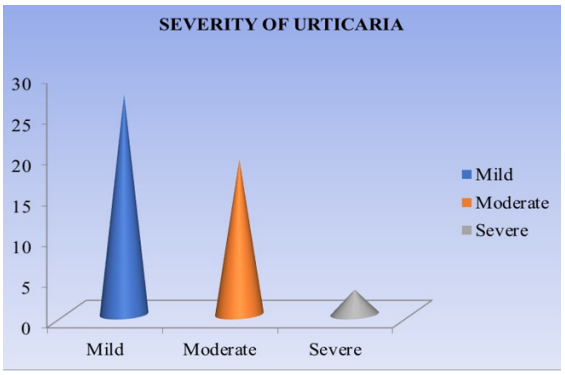

Fig. 1: Severity ofurticaria

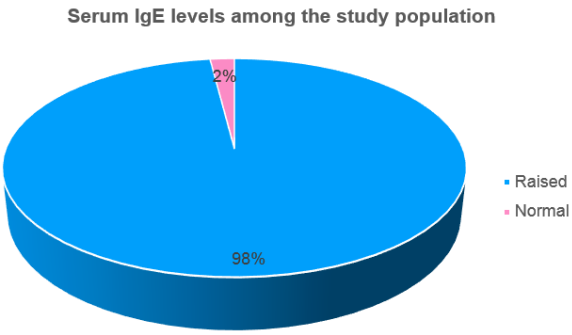

Fig. 2: Serum IgE levels among the study population

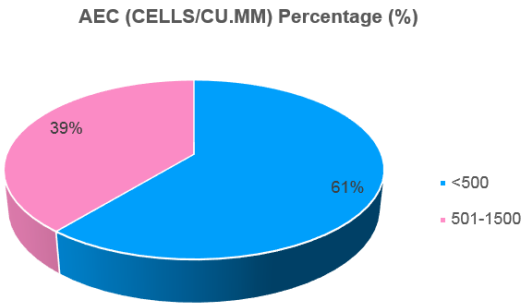

Fig. 3: AEC among study population

4. Discussion

Urticaria is caused by mast cell and basophil degranulation releasing histamines and other inflammatory mediators. A typical hive is an erythematous, pruritic, raised wheal

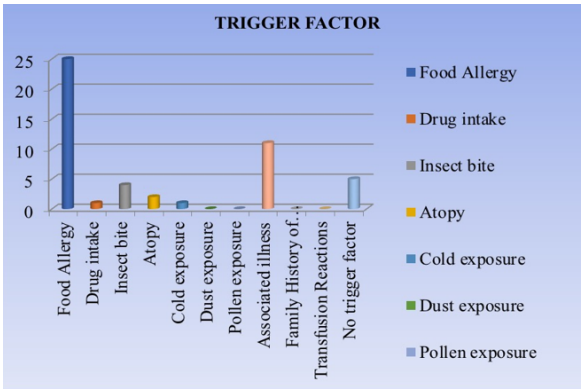

Fig. 4: Trigger factors among the study population

Table 1: Normal serum IgE levels according to age groups

Age	Serum ige Levels IU/ml
Neonates	1.5
<1 Years	15
1-5 Years	60
6-9 Years	90
10-15 Years	200

Table 2: Comparison of severity of urticaria with serum IgE

Severity of Urticaria	Mean ± 2 SD	P value
Mild	692.57±442.28	
Moderate	1128.87±749.57	0.028
Severe	4048.40±2881.52	

P Value Using Kruskal Wallis Test

Table 3: Comparison of severity of urticaria with AEC

Severity of Urticaria	Mean ± 2 SD	P value
Mild	485.51±248.69	
Moderate	640.86± 301.20	0.046
Severe	456.68± 326.54	

P Value Using Kruskal Wallis Test

Table 4: Comparison of serum IgE and AEC

Serum IgE	AEC		P value
	Normal	Increased	
Normal	1(2.04%)	0(0%)	0.0019
Increased	29 (59.18%)	19(38.78%)	

that blanches with pressure and transient in nature that resolves without any residual lesions, unless the area was intensely scratched. Urticaria commonly presents with intensely pruritic wheals, sometimes with edema of the subcutaneous or interstitial tissue. Urticaria can even present with angioedema which may be a life threatening condition due to asphyxiation when larynx is involved.[6]

The most common etiological factors causing urticaria includes infections, food allergy, drugs, atopy, systemic disease and sometimes can occur as autoimmune. HLA DRB1* 04(DR4) and DQB1*0302 are strongly associated with autoimmune urticaria. Most of the autoimmune urticaria are chronic in nature.[7]The common food substances causing urticaria includes meat, egg, nuts, sea foods like fish, crab, prawn, dairy products and some fruits such as cherries, strawberries, citrus fruits, avacado and some food addictives can also produce urticaria such as azo dyes, benzoic acid and nitrites.[8] Urticaria is an allergic condition where eosinophils plays an important role, hence the measurement of AEC and serum IgE may be helpful in identifying and classifying the severity of the disease.

Few literature have demonstrated the serum IgE and AEC levels in urticaria in children. The present study was undertaken to evaluate the significance of absolute eosinophil count and serum IgE levels in children with urticaria.

In the present study the most common age group affected was > 5-12 years with mean age of the study population was 6.75±3.47 years. This was similar to Techasatian et al[2] with mean age of 7 years. However this was contrast to the study conducted by Kumaran et al[9]in which mean age was 11.34 years. Among the study population, 57.14% were males and 42.86% were females which is similar to the study conducted by Techasatian et al[2]in which 54.95% were males and 45.05% were females. This was contrast to the study conducted by Vikramkumar et al[10]where 58.3% were females and 41.6% were males. The most common trigger factor found in this study was food allergy 51% followed by infection 22.44% shown in figure 4. This was contrast to the study conducted by Techasatian et al[2]where only 30.7% were found to have food allergy. Another study by Yilmaz et al[11]showed only 0.9% have food allergy and 0.9% have infections as trigger factors. urticaria activity score, the study population have been classified as mild, moderate and severe. In the present study, most of the study population belongs to mild category 55.1% followed by moderate 38.5% and severe 6.12% depicted in Figure 1. This was contrast to another study conducted by Naveen et al[12] where 46.6% belongs to moderate, 30.09% belongs to mild category. However in both studies, the study population coming under severe category were less in numbers.

In the present study, mean serum IgE levels noted were 1046±1131.3 which was contrast to the many others studies conducted by Naveen et al.[12] Yilmaz et al,[11] Kessel et al[13]whose mean serum IgE levels were 759±73.79, 63.5, 182±16.12 respectively. In the present study, the mean absolute eosinophil count was 543.98±27.42 which was similar to the study conducted by Naveen et al[12]whose mean AEC was 541±36.01. We also found a statistical significance between absolute eosinophil count and serum IgE with disease severity and can be considered as a valuable markers in children with urticaria.

Also there was a positive correlation between absolute eosinophil count and serum IgE with significant p value 0.0019. Hence this study concludes that the disease severity is directly proportional to the levels of absolute eosinophil count and serum IgE levels.

5. Limitations

The major limitations of the present study was that the sample size is less. We used UAS for 24 hours and categorised the study population instead of UAS7 as which is calculated over a periods of 7 days, but here the study population were discharged within maximum of 4 days in the present study.

More detailed studies are needed to evaluate the correlation between absolute eosinophil count and serum IgE in children with urticaria. Further more studies are needed to know the prevalence and various etiological factors in childhood urticaria.

6. Conclusion

The present study identified a high prevalence of the disease in children with age group of >5-12 years. We found that the disease severity increases with increasing levels of absolute eosinophil count and serum IgE. Thus, the current study suggests that absolute eosinophil count and serum IgE needs to be regarded as a valuable markers of disease severity and management in children presenting with urticaria.

7. Conflicts of Interest

None.

8. Source of Funding

None.

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