Allergic Affections of the Larynx in Children-A Clinico Pathological Study

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Abstract

Laryngeal manifestation of allergy though less common than, Rhinosinusitis, tubotympanitis and bronchopulmonary allergy but it is not that uncommon which is usually misdiagnosed and mistreated in children. Hence the importance of larynx as the allergic shock organ in children with spasmodic croup and laryngotracheo bronchitis. In the present study in children below five years, presenting with stridor and/or hoarseness were evaluated regarding the history of allergy, direct laryngoscopic finding, measurement of serum 1 g E. Presence of eosinophilia and histopathological examination of laryngeal biopsy. Out of the 80 cases studied 9 cases (11.2%) presented with associated allergic manifestation, 8 cases (10%) having family history of allergy, 4 cases (5%) having raised serum 1 g E, 12 cases (15%) with eosinophilia 3 cases (3.75%) with eosinophilic infiltration on histopathological examination of the biopsy material taken during the direct laryngoscopy

Key Words

Allergy, Oedema, Children, Larynx, 1GF

Laryngeal allergy in children though not as common allergic rhinosinusitis, tubotympanitis and bronchopulmonary allergy but it is not uncommon either. As it is frequently misdiagnosed and mistreated hence the importance of larynx as an allergic shockorgan in children with spasmodic croup and laryngotracheo bronchitis. The allergy may be in various forms like ingestants, injectants, inhalants etc like various type of foods, drugs, pollens or the allergy may be endogenous, when no exogenous allergen is found.

Historical Account

Allergy was recognised and mentioned even in the ancient relics tracing back to the year 2641 B.C. in Egyptian history. It is mentioned that king menses died from the bite of a hornet. Our present knowledge of the effect of insect bite on susceptible or allergic cases throws light on the probable cause of death of king mense. Hippocrates (460-357 B.C.) also recognised allergy. Food allergy as a cause of illness was recognised as early as the 1st. century B.C. by a roman poet who observed that "One man's meat is other man's poison".

Material and Method

The present study is based on a series of 80 cases below 5 years of age, selected at random who presented with stridor and or hoarseness of voice at smt. sucheta kripalini hospital and Kalawati saran children hospital of lady Harding Medical College during a span of one year. After recording a brief history and clinical examination, direct Laryngoscopy was done in all the cases and Laryngeal biopsy was done in selected cases with oedematons larynx.

A complete haematological examination of the peripherel blood was done as a routine with particular reference to differential leucocyte count for detecting eosinophilia. A quantitative estimation of the serum IgE was done in cases suspected of allergy which was carried out by the technique of single radial diffusion in agar, introduced by Mancine et al using self prepared immunidiffusion plates basing on the principle that when an unknown amount of antigen is allowed to diffuse from a well in an antibody impregnated agar, the diameter of the ring precipitate

is directly propotional to the amount of antigen and inversly proportional to the concentration of the antibody employed. W.H.O. standard was employed in which the standard sera was used in three serial dilutions. A straight line was obtained by plotting of different solutions and different dilutions were set with every test plate. Dilution of the antisera was found so that the optimal concentration of antisera gave a straight line relationship between antigen concentration and ring diameter on semilog paper. The dilution used for IgE is 1 : 150.

Observations

In the present series, the following observations are made as shown in the tabular form in which table No. 1 shows associated allergic manifestations Table No. 2 shows family history of different allergic manifestation, Table No. 3 shows status of larynx on direct laryngoscopy, Table No. 4 shows degree of eosinophilia in food in DLC; Table No. 5 shows the histopathological feature of laryngeal biopsy. Table No. 6 shows the serum IgE titres in international units.

Table No. 1

Associated Allergic Manifestations	No. of Cases	Percentage (Total)
Asthma	3	11.2%
Eczema	2	
Secretoryotitismedia	2	
Drug allergy (Penicillin)	1	

Table No. 2

Allergic Family History	No. of Cases	Percentage
Bronchial Asthma	4	10%
Allergic Rhinitis	2	
Food Allergy	1	
Eezema	1	

Table No. 3

Direct laryngoscopic Finding	No. of Cases	Percentage (Total)
Supraglottia Oedema	4	
Subglotic Oedema	2	7.5%

Table No. 4

Differential leucocyte count (DLC)	No. of Cases	Percentage
Neutrophilia	8	15%
Lymphocytosis	19	
Eosinophilia	12	
Normal	41	

Table No. 5

Laryngeal Histopathology	No. of cases	Percentage (Total)
Oedema with Eosinophic Infiltration of tunicapropia	3	3.75%

Table No. 6

Serum IgE titre (Normal 90. 1. U)	No. of cases	Percentage
	4	5%
Case 1. 2480 I.U		
Case 2. 3680 I.U		
Case 3. 4100 I.U.		
Case 4. 4500 I.U		

Review of Literature

In 1819, John Bastock of Guy's Hospital, London, a patient of hay fever himself described a condition similar to allergy but it was Blacklay (1873) who proved and identified a grass pollen as the fundamental cause of hay fever. The current concept of allergy started in 1902 when Richert showed that a second dose of foreign protein could be fatal instead of giving beneficial effect and his own favourite dog was killed in that experiment. The term allergy was proposed first by von pirquet in 1906. Victor C. Varghan (1957) has thrown further light on the allergic problems of the upper respiratory tract. He found that allergic croup may resemble either spasmodic or non-infective croup. He also emphasized the fact that in allergic family, recurrent attack of acute laryngitis in child were strongly suggestive of future asthma which demands careful evaluation of the child. Orvin E. Anderson (1958) brought out the fact that allergic reaction from antibiotics is essentially an angioneurotic oedema sylvaster C. Missal (1971) studied the role of food allergy in E.N.T. diseases who undertook the hyposensitisation therapy based on

provocative food test. He had mentioned the unique report by Russian, Alimove, (1968) who claimed that in 69 out of 245 cases with laryngitis, allergy was found as the underlying cause. He has reviewed the work of moses (1954) who mentioned the case of a 9 year old boy, an excessive eater of icecream and canddy bar with oedematous vocal cords that improved by elimination of those food stuffs. Paparella (1964) reported a case of severe laryngeal Oedema due to bee-sting into the left aerytenoid cartilage. Wolf (1968) has stressed the importance of larynx as the allergic shock organ in children with spasmodic group and laryngotracheo-bronchitis in 42 out of 48 patients. He has stated in his series that sesonal allergy involves the professional singer in a special way. Rag weed allergy, the most frequent of the pollen allergy reaches its climax just when the musical season begins, particularly the odd hit were the Jews congregation, as the high holiday falling during the rag weed season. Russel I. William (1972) reported in his series that the mucose of the nose, P.N.S, Pharynx and bronchi were well documented as shock organs involving the respiratory tract of which larynx forms an integral part. Lup. Q. Pang (1974) studied the role of allergen in larynx, trachea and bronchial tree. He pointed out that drugs, food and inhalants are common causes of laryngeal Oedema. Among the drugs are coal tar products, aspirin and pencilin. Cases of acute Oedema of larynx are also being reported due to prolonged injection of iodide, injection of dephtheric and tetanus antitoxins and vaccines food like wheat, corn egg, milk, tomato, potato etc. Hubscher (1977) carried out a study on immune and biochemical mechanisms involved in the allergic diseases of upper respiratory tract. He stated that IgE antibodies are also synthesized by the lymphoid tissue of the upper respiratory tract as a result of co-operation between 'T' and 'B' cells. According to him locally synthesized IgE antibodies are attached to the mast cells also. The number of IgE on target cells range from 30,000 to 90,000. He also stated that eosinophilia is considered to be the hall mark of allergic diseases and tissue eosinophilia is marked at the site where immunological reaction involving the reagine antibodies occurs.

Discussion

In the present series 11.2% of cases presented with

other associated allergic manifestation and 10% with a family history of allergy. Wolf (1966) in a series of 48 cases of spasmodic croup and laryngotracheobronchitis found 28 cases having family history of allergy in the form of asthma, eczema, allergic Rhinitis and food allergy. Victor R.C. Varhan (1957) emphasized the importance of allergic family. Arthurton (1970). stated that all the cases of spasmodic laryngitis in his series with stridor, had history of allergy. Croup has been referred to as a manifestation of allergy by many other like Vaughan and Black (1948) Row (1944). Cohen and Spain (1947). Nelson (1975) mentioned that 15% of all the cases with croup had a strong history of allergy. Food as a cause of allergy of larynx was studied by Sylvester C. Missal (1971), Bronitx, F.S. (1971), Moses (1964) and Lup. Q. Pang (1974). There was only one case of food allergy from milk and/or apple in the present series. Orvin E. Anderson (1958) brought out the fact that allergic reaction from antibiotic is essentially an angioneurotic Oedema. In his study of 4 cases all had a febrile reaction of 2-4 days duration after receiving penicillin injection. In the present study there was a single case of laryngeal Oedema after penicillin injection.

According to Hubscher (1971), Lowel (1968) and Schwartz (1970) blood Eosinophilia is a reliable indicator of the presence of allergy. The importance of eosinophilia as a hallmark of allergy was also stressed by Vaughan et al (1954) and Fouch (1971). Swimmy (1956) observed high blood eosinophilia in many patients with food allergy. He reported a case of milk allergy with 97%. Eosinophil count which dropped to 6% only by avoiding milk. In the present study mild to moderate increase in eosinophil count was found in 15% of cases. In one case the count was 40% which was maximum.

Pale laryngeal oedema was found in 7.5% of the cases on direct laryngoscopy either in supraglottic or in subglottic region in the present study. Wolf (1966), a Pediatric otolaryngologists also reported similar findings but in very high percentage of cases. Arthurton (1970) reported 2.4% of his cases as subglottic allergic oedema. Heensel (1953) also mentioned supraglottic allergic oedema. Clemeis and

Derlaki (1970) stated that histopathologically airway allergy in children is characterised by nonspecific inflammation of the tunica propria was found in 3.75% of cases Shamburg (1931) studied 440 specimens of tissues of upper respiratory tract in which found marked thickening of the basement membrane in 2% of cases.

In the present series, serum IgE titre was found to be very high in all the four cases suspected of allergy. The increase of serum IgE level in allergy was also mentioned by Robert Cruickshank et al (1974) and Hubscher (1977) in the present study corticosteroid was used 23.2% cases systemically with marked improvement of the laryngeal oedema. Eden et al (1967) advocated routine use of steroid in the treatment of croup. Davison (1959) stated that parenteral administration of corticosteroid in high doses reduces the incidence of tracheostomy. Roses in 1969 reviewed 263 cases of laryngotracheobronchitis where tracheostomy was not required for those children who received adequate dose of steroid.

Conclusion

In the light of the detailed study in the present series of the role of allergy in laryngeal oedema it may be concluded that though it is not as common as other allergic phenomenon in the respiratory tract but still a significant percentage of cases do present with laryngeal allergy of various types like spasmodic croup, Allergic laryngitis and laryngotracheobronchitis etc. where the family history of allergy and associated manifestation of other allergy may be present. Most of the cases have moderate to high count of eosinophils in the blood and also shows eosinophilic infiltration of the tunica propria in the histopathological examination of the biopsy done during direct laryngoscopic examination which also shows pale oedema over the supraglottic and subglottic area. Serum IgE estimation is an important parameter, the titre of which is increased very significantly in allergic cases. Systemic administration of steroid plays an important role in the management of these cases. Endotracheal intubation or tracheostomy was done in some cases having severe laryngeal obstruction to relieve the airway.

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