

Immunological Studies in Bronchial Asthma

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Abstract-*Asthma being an inflammatory disorder of the airways involves several inflammatory cells and multiple mediators that result in characteristic pathophysiological change.*

The immunological of development asthma is dependent on an IgE response controlled by T&B lymphocytes and activated by the interaction of antigen with mast cell bound IgE molecule. Allergic asthma is frequently seasonal and it is most often observed in children and adult.

Asthma is an extremely common disorder affecting men and women equally. Most cases of asthma being before the age of 25, Asthma may being anytime throughoutlife.

I. Introduction-

The Humoral and cellular immune response in bronchial asthma and conflicting reports initiated the present study which was undertaken with the following aim and objectives

- To estimate the levels of serum immunoglobulin A, G, M and E in control and in asthmatics.
- Analysis of correlation (if any) between the rise and fall in immunoglobulin levels and then significance to the types and spectrum of asthma.

II. Material And Method

Estimation of Serum Immunoglobulin's (IgG, IgA and IgM) were measured by "Single radial immunodiffusion" direct method of Mancini and co-workers (1965).

Estimation of IgG, IgA and IgM were carried out by using the tripartigen plate (immunodiffusion plates for quantitative determination) by diagnostic kits available from Behring Company (Germany) supplied by Hoechst Pharmaceuticals Bombay in the control group and in patients of Bronchial Asthma. Enzyme immunoassay method was used for determination of human IgE in Serum Samples.

OBSERVATIONS

The present study consisted of 350 cases of bronchial asthma (study Group) and 150 age and sex matched healthy non-allergic controls.

TABLE -1
AGE AND SEX DISTRIBUTION IN THE CONTROL GROUPS

Age Group	Controls		Age wise total No. of cases
	Male	Female	
0–10	10	8	18
11–20	15	14	29
21–30	25	20	45
31–40	20	15	30
41 and above	15	13	28
Total	85	70	150

TABLE -2
AGE AND SEX DISTRIBUTION IN ASTHMATICS

Age Group	Asthmatics		Age wise total No. of cases
	Male	Female	
0-10	20	15	35
11-20	36	31	67
21-30	69	47	116
31-40	33	35	68
41 and above	36	28	64
Total	194	156	350

TABLE -3
SERUM IMMUNOGLOBULINS LEVELS IN CONTROL AND ASTHMATICS

Group (No. of cases)	Immunoglobulin levels			
	IgG (mg/dl)	IgA (mg/dl)	IgM (mg/dl)	IgE (Iu/ml)
CONTROLS (n = 150)	1092.52 ± 348.96	228.76 ± 67.47	146.02 ± 38.24	85.46 ± 48.24
ASTHMATICS n = 350	1150.88 ± 348.96	189.02 ± 54.83	178.54 ± 44.52	1825.60 ± 1225.28
P Value	>0.05	<0.05	<0.05	<0.001

TABLE -4
CHANGE IN SERUM IgE LEVELS IN THE CONTROLS WITH INCREASE IN AGE AND SEX MATCHED GROUP

Age Groups in years	No	MALES		FEMALES		AGEWISE TOTAL Mean ± S.D. (Iu/ml)
		Mean ± S.D. (Iu/ml)	No	Mean ± S.D. (Iu/ml)	No	
0 - 10	10	85.52 ± 48.12	8	85.40 ± 48.16	18	85.47 ± 48.15
11 - 20	15	85.78 ± 48.78	13	85.68 ± 48.50	27	85.73 ± 48.65
21 - 30	25	84.92 ± 47.76	19	84.76 ± 46.93	44	84.85 ± 47.85
31 - 40	20	84.71 ± 47.31	15	85.57 ± 48.44	34	85.65 ± 48.38
41 & above	15	84.67 ± 48.25	12	85.73 ± 48.17	27	85.70 ± 48.21
	85	85.52 ± 48.25	67	85.44 ± 48.25	150	85.48 ± 48.25

TABLE - 5
SERUM IgE IN THE ASTHMATICS WITH INCREASE IN AGE DISTRIBUTED IN AGE AND SEX MATCHED GROUP

Age Group in years	MALES		FEMALES		AGEWISE TOTAL	
	No	Mean ± S.D. (Iu/MI)	No	Mean ± S.D. (Iu/MI)	No	
0 – 10**	20	2383.05 ± 1094.79	15	1265.45 ± 1354.85	35	1824.25 ± 1224.82
11 – 20***	36	2383.51 ± 1102.32	31	1265.23 ± 1356.60	67	1824.35 ± 1229.46
21 – 30***	69	2385.71 ± 1097.57	47	1268.05 ± 1352.85	116	1825.36 ± 1225.20
31 – 40***	33	2385.77 ± 1100.28	35	1266.85 ± 1356.42	67	1826.30 ± 1228.35
41 & above***	36	2389.40 ± 1092.48	28	1266.18 ± 1344.64	68	1826.79 ± 1218.56
Total	194	2384.89 ± 109.57 ***	156	1266.35 ± 1352.85	350	1825.62 ± 1225.28

Significant *** P < 0.001; comparison between group and control.

Significant *** P<0.001 : comparison between Male and Female Asthmatics.

TABLE - 6
SERUM IMMUNOGLOBULIN LEVELS IN DIFFERENT TYPE OF BRONCHIAL ASTHMA ACCORDING TO THE FREQUENCY OF ATTACK

Type of Asthma	No. of cases	SERUM IMMUNOGLOBULIN (Mean ± S.D.)			
		IgG (mg/dl)	IgA (mg/dl)	IgM (mg/dl)	IgE (U/ml)
EPISODIC	165	1142.40 ± 268.20	190.85 ± 38.48	204.48 ± 20.40	1068.60 ± 720.85 ***
PERENNIAL	165	1123.86 ± 224.80	188.02 ± 36.60	197.23 ± 23.32	2088.72 ± 641.18 ***
P Values		> 0.05	> 0.05	> 0.05	< 0.001

Comparison between group and control

*** P < 0.001 significant

TABLE - 7
SERUM IMMUNOGLOBULIN LEVELS IN DIFFERENT TYPE OF BRONCHIAL ASTHMA
BASED ON ATOPIC CHARACTER

Type of Asthma	No. of cases	SERUM IMMUNOGLOBULIN (Mean ± S.D.)			
		IgG (mg/dl)	IgA (mg/dl)	IgM (mg/dl)	IgE (IU/ml)
A EXTRINSIC	198	108.42 ± 282.46	185.46 ± 46.82*	201.55 ± 20.04**	1645.26 ± 1048.23***
B INTRINSIC	102	1058.23 ± 254.26	206.23 ± 38.42 *	186.19 ± 38.45**	982.91 ± 384.24***
F UNCLASSIFIED	50	1080.40 ± 204.28	200.97 ± 40.65*	192.45 ± 28.48**	873.20 ± 402.34 ***
P Values	A : B	<0.05	>0.05	<0.05	<0.001
	A : C	<0.05	>0.05	<0.05	<0.001
	B : C	<0.05	>0.05	<0.05	<0.05

Comparison between group and control

*P < 0.05 significant

**P < 0.01 significant

***P < 0.001 significant

III. Result And discussion

Bronchial Asthma is an immunological disorder resulting from the antigen-antibody reaction. The two notable immunological parameter that are expected to be influenced are the various immunoglobulin and the T&B lymphocytes as well as other cells such as neutrophils, monocytes and eosinophils were therefore estimated in control subjects and patients of bronchial asthma.

Present study consists of 350 cases of Bronchial Asthma (study group) and 150 age and sex method healthy non allergic control (Table No.1& TableNo.2).

In Table No.3 Apparently high IgG, IgM and IgE levels were observed in the study group as compared to the control groups. Significantly elevated IgM and IgE levels were observed (P<0.05 and P<0.001 respectively) however, an insignificant elevation (P>0.05) was seen in IgG levels. A significant (P<0.05) was seen in IgG levels. A significant (P<0.05) depression was observed in the IgA levels in asthmatics as compared to controlgroup.

In Table 4 and 5 the main asthmatics has IgE levels of 2384.89 ± 1097.97 IU/ml while the female asthmatics had 1266.35± 1352.85 IU/ml IgE concentration. These values was significantly (P<0.001) elevated when compared to the male and female controls (85.52 ±48.25 IU/ml and 85.44 ± 48.25 IU/ml respectively). The male asthmatics had a significant (P<0.001) elevation in mean IgE concentration when compared to female asthmatics.

In Table 6 showing serum Immunoglobulin levels in different types of Bronchial Asthma based on frequency of attack.

- IgG: An significant (P>0.05) elevation was observed in the IgG concentrations in the asthmatics. When compared to the controls. The difference among the two asthmatics groups was insignificant(P>0.05).
- IgA: Significantly (P<0.05) reduced IgA levels were observed in the asthmatic groups when compared to the controls, although, the difference among the group was insignificant (P>0.05).

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- IgM: Statistically (P<0.05) reduced IgM levels was observed in the asthmatic groups when compared to the controls, although, the difference among the group was insignificant (P>0.05).
- IgE: Significant (P<0.001) elevation in IgE concentrations was observed in the episodic and perennial asthmatic group when compared to the controls. The perennial (209.72± 641.18 IU/MI) had highly significant (P<0.001) difference with the episodic (1069.62 ± 720.85 IU/ml)group.

In Table 7 change in Serum Immunoglobulin levels in different types of Bronchial Asthma Based on Atopic character.

- IgG: In significantly (P>0.05) elevated IgG levels were observed when compared to the controls but had statistically significant (P<0.05) difference among the asthmatics group.
- IgA: Significantly low (P<0.05) IgA level were observed in each of above asthmatic group when compared

to controls with an insignificant ($P>0.05$) difference among the groups.

- IgM: Significantly ($P<0.01, P<0.05$ and $P<0.05$ r.s.p) elevated IgM levels were observed in the Extrinsic, Intrinsic and unclassified group when compared to the controls. The difference among the group was statistically ($P<0.05$).
- IgE: The value of P highly significant ($P<0.001$) in IgE concentration in asthmatics as compared to the controls. The Extrinsic (1845.26 ± 1048.23 IU/ml) asthmatics had highly significant ($P<0.001$) elevation when compared to the Intrinsic (982.91 ± 348.28 IU/ml) and unclassified (873.20 ± 402.38 IU/ml) asthmatics.

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