International Journal Dental and Medical Sciences Research
Volume 5, Issue 1, Jan-Feb 2023 pp 307-310 www.ijdmsrjournal.com ISSN: 2582-6018

Incidence of Allergic Rhinitis in polymorphic ABO Phenotype

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Submitted:17-01-2023 Accepted: 30-01-2023

ABSTRACT:
BACKGROUND: Allergic rhinitis is one of the most frequent systemic inflammatory disorders.
AIM: The aim of the study is to identify the association between Allergic rhinitis and ABO phenotype
MATERIALS AND METHODS: Cross sectional study was carried out in patients with Allergic rhinitis using standard guidelines in a Tertiary care hospital. It is based upon the observations made on 75 cases of allergic rhinitis for a period of 2 months.Only the consenting individuals were admitted to the study sample.
RESULTS: The cases found in ABO phenotype A, B, AB, O were 21,9,3,42 respectively. It was found that the blood group 'O' was most common (n=42), followed by blood group 'A' (n=21).
CONCLUSION: Our study concludes that O blood group phenotype is associated with allergic rhinitis. Association between allergic rhinitis and ABO phenotypes will be helpful in identifying the people who are at risk for developing these allergies to improve strategies towards its prevention which would result in better outcome and treatment of patients.
KEYWORDS: Allergic rhinitis,ABO phenotype

I. INTRODUCTION:

Allergic rhinitis is an Ig E mediated immunological response of nasal mucosa to airborne allergens and it is characterized by watery nasal discharge, nasal obstruction, sneezing and itching in the nose. It affects the upper airway tract and causes inflammation of nasal mucosa. Allergic rhinitis depends on environmental and genetic factors. Allergic rhinitis is one of the most frequent systemic inflammatory disorders.

The immunological response is directed at one or more variety of aeroallergens [Kilpelainen et al.,2006]. The pathogenesis is complex and multifactorial in origin, with both environmental and genetic components being essentially involved [Grammatikos et al., 2008]. Indeed, one of the environmental theories connecting with the recent trend of increasing prevalence of atopic disorders has been the 'hygiene hypothesis', i.e., extreme protection from environmental infectious stimuli, interfering and hampering the development of immune system [Carpeggiani et al.,2011]

The ABO histo-blood group system is one of the genetic risk factors linked to the susceptibility to asthma in some populations while many candidate genes have been markedly associated with AR,including inter alia, IL-4, IL-13, HLA-DRB,TNF, LTA and FOXP3. [Saini et al.,2014] [Grammatikos et al., 2008].

Glycosyltransferases are controlled by the ABO system to build oligosaccharide structures on the cell surface of erythrocytes and vascular endothelium, as well as in the exocrine secretion system including the respiratory tract. Alpha-2-fucosyltransferases FUT1 (H) of red blood cells and vascular endothelium, and FUT2 (Secretor positive) of the exocrine secretion system, are structural genes that collaborate with glycosyltransferases.

When a combined analysis of ABO blood groups and secretor phenotypes was performed, a cooperative interaction between the two systems was described. Blood group O/non-secretor subjects had lower lung function values and higher prevalence of atopy. [Carpeggiani et al.,2011]. The objective of this study is to identify Allergic Rhinitis and to investigate its association with different blood groups.

II. MATERIALS AND METHODS:

Cross sectional study was conducted for a period of 2 months in a tertiary care center. It is based upon the observations made on 75 cases of allergic rhinitis and the period of sample collection was from June 2021 to July 2021. Only the consenting individuals wereadmitted to the study sample.

ABO blood group of the study population was done by hemagglutination method and the diagnosis of allergic rhinitis was done based on the history and clinical examination. A detailed history of the study population regarding age, sex, family history and others were recorded on a preformed profoma and prevalence of AR in each blood group

International Journal Dental and Medical Sciences Research
Volume 5, Issue 1, Jan-Feb 2023 pp 307-310 www.ijdmsrjournal.com ISSN: 2582-6018

was found. The cardinal symptoms were sneezing, nasal discharge and nasal obstruction.

III. RESULTS:

In this study, a total of 75 patients were involved. The age distribution is shown in table 1. The most common age group affected was between 11 to 20 years (27%) followed by 31 to 40 years (22%)

In total, 42(56%) were male and 33(44%) were female with a male to female ratio of 1.2:1. The sex distribution is shown in Table 2.

Demographic and clinical profile of patients with allergic rhinitis is shown in table 3. 13 (17%) patients belonged to rural area while 62 (82%) patients were from urban area with most common presenting symptom sneezing (64%), followed by nasal discharge (19%), and nasal obstruction (17%). 30% of the patients had positive family history.

Most of the patients (66%) complained disturbance in their daily activity and sleep affecting their work productivity and performance. It was also found majority of patients were diagnosed mild intermittent rhinitis (14.6%), mild persistent rhinitis (21.3%), moderate–severe intermittent rhinitis (17.3%), and moderate/severe persistent rhinitis (46.6%). Moderate - severe persistent rhinitis were most prevailing when compared to mild and moderate intermittent and mild persistent rhinitis. Comorbid conditions associated with allergic rhinitis in this study were bronchial asthma (22.6%), sinusitis (65.3%), atopic dermatitis (5.30%) and allergic conjunctivitis (6.60%).

In this study, the cases found in ABO phenotype A,B,AB,O were 21,9,3,42 respectively. It was found that the blood group 'O' was most common (n=42), followed by blood group 'A' (n=21). The distribution of ABO phenotype among the patients is shown in table 4.

TABLES

TABLE 1. Age distribution among the cases

AGE (years)	Number of patients	Percentage
11 - 20	27	36%
21 – 30	19	25.3%
31 - 40	22	29.3%
41 - 50	4	5.3%
51 - 60	3	4%

TABLE 2. Sex distribution among the cases

Sex	Number of patients	Percentage
Male	42	56%
Female	33	44%

TABLE 3. Demographic and clinical profile of patients with allergic rhinitis

Habitation		
Urban	62	82%
Rural	13	17%
Co morbid conditions		
Bronchial asthma	17	22.60%
Sinusitis	49	65.30%
Atopic dermatitis	4	5.30%
Allergic conjunctivitis	5	6.60%
Predominant symptoms		
Sneezing	48	64%
Nasal discharge	14	19%
Nasal obstruction	13	17%
Type and severity of the disease		
Mild intermittent		
Mild persistent	11	14.60%

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Moderate severe intermittent Moderate severe persistent	16 13 35	21.30% 17.30% 46.60%
Effect on sleep/ daily activity		
Normal Disturbed	26 49	34.60% 65.30%

TABLE 4. Distribution of ABO phenotype among the cases.

BLOOD GROUP	**Number of patients**	**Percentage**
A	21	28%
B	9	12%
AB	3	4%
O	42	56%

IV. DISCUSSION:

Patients of all age groups are susceptible to allergic rhinitis but maximum cases occurred in patients between the age group of 11 to 20 years (36%) followed by 31 to 40 years (29.3%). Similar findings were seen in study by Topno et al., (2017) which showed a higher prevalence in the age group 11 to 20 years (35%) followed by 31 to 40 years (45%).Deb et al., (2014) majority of the AR patients (33.3%) belonged to 30–39 years of age group followed by 30.5% in 20–29 years age group. Also in study of Osman et al., (2007) that presentation of allergic rhinitis increased progressively during childhood reaching a peak at 16 years.

Majority of patients in our study belonged to urban region which was in concordance with Cingi et al., and Topno et al., (2017) and in discordance with Zheng et al. (2015) and Deb et al. (2014) where population affected more belong to the rural region. The reason for higher incidence of AR in urban population may be the higher level of air pollution in urban areas.

In the study, most patients presented, fell within the moderate–severe persistent group (46.60%) which is similar to the studies done by Topno et al., (2017), Lee et al. (2008), Navarro et al., (2008) and Bousquet et al., (2003) (44, 51, 34.7 and 35%) respectively. This may be because the patients presented late to the doctor.

Similar to our study, Yeger et al. [2010] concluded that children with allergic rhinitis showed significant 5–20% lower preference to participate in activity than their typical peers. Also Canonica et al. (2008) study reported large percentage of patients had difficulty in falling asleep ranging from 47% in Spain to 26% in Germany and the United Kingdom. AR shows most pronounced symptoms in the night and the early morning. Nasal airway resistance is also increased in the recumbent position further increasing nocturnal congestion (1966). These causes insomnia at night, thus causing daytime sleepiness and fatigue Topno et al.,(2017).

Our study showed majority of the patients had blood group O showing association between ABO phenotype and allergic rhinitis. This was in consistent with the study of Falsarella et al (2011). and Topno et al.,(2017) . Similar association were seen in the patients of bronchial asthma with the blood group O in the study of Saini et al. (2014), Al-Shamma et al. (2008), Chen et al. (2005) and Ronchetti et al. (2001).

However, many of the studies showed different results. El-Mehairy et al. [26] and Filsoufi (1975) observed much higher A and AB and lower O frequencies in the patients of allergic diseases. Bijanzadeh et al.(2009) and Brachtel et al.(2011) showed no significant differences in the distribution of ABO phenotypes between patients and controls. de la Vega et al. (1976), Anand (1964), Khalil (1960) and Moniwa (1960) have analyzed the ABO distribution in the patients with bronchial asthma and found a clear and statistically significant surplus of B phenotypes and an O deficit.

V. CONCLUSION:

Our study concludes that O blood group phenotype is associated with allergic rhinitis. Association between allergic rhinitis and ABO phenotypes will be helpful in identifying the people who are at risk for developing these allergies to improve strategies towards its prevention which would result in better outcome and treatment of patients.

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