

## Correlation between ABO Blood Group and Recurrent Aphthous Stomatitis among South Indian Population

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**Abstract:** Background: Recurrent aphthous stomatitis (RAS) is an inflammatory condition that is characterized by the presence of recurrent, painful, single or multiple ulcerations of oral mucosa. Though a lot of factors have been cited in the literature regarding the etiology of RAS, it still remains unknown. Since ABO blood group is related to immunity and genetics, it could possibly play a role in the development of RAS. Aim: To determine the correlation between ABO/Rh blood groups and recurrent aphthous stomatitis. Methods: A cross sectional observational study was carried out among 430 dental students. The data obtained from the study participants regarding the history of RAS and their blood groups was subjected to Chi square test to find the correlation between the variables. Results: 'A' blood group individuals have a higher prevalence of RAS followed by 'O', 'B' and 'AB' blood groups. However there is no statistically significant correlation between the variables. Conclusion: Lack of statistical significance indicates for larger sample to determine any correlation between ABO blood group and RAS

**Keywords:** Aphthous stomatitis, Aphthous ulcer, Blood group, Genetics, Oral ulcer

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Date of Submission: 10-04-2019

Date of acceptance: 26-04-2019

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### I. Introduction

Recurrent aphthous stomatitis (RAS) is one of the common painful conditions affecting the oral mucosa characterized by repeated episodes of oral ulcerations that heal spontaneously with subsequent recurrence.<sup>1</sup> The term "aphthae" comes from the Greek word aphthi which means "to inflame" or "to set on fire", and it is believed to have been first used by the philosopher Hippocrates to describe the pain associated with a common disorder of the mouth during his time (likely to be aphthous stomatitis).<sup>2</sup>

Although recurrent aphthous stomatitis is self-limiting this appears to be a chronic incurable condition that causes severe discomfort to the patient during, speaking, eating or drinking. The exact cause of RAS is unknown and it is thought to be multifactorial with familial tendency or genetic predisposition, allergy, hormones, medications, stress or anxiety, and immunologic abnormalities as predisposing factors.<sup>3,4</sup>

Genetics and immunity have been known to play a key role in the pathogenesis of RAS. Immunological abnormalities and a cell mediated immunopathogenesis have been suggested by the histopathological appearance of early lesions of RAS.<sup>5</sup> Immunological changes such as cytotoxicity of T cells against oral mucosal epithelium, antibody-dependent cell-mediated cytotoxicity, immune complex deposits in the oral mucosa, changes in the ratio of CD4 to CD8 cells, and increased levels of interleukin 2, interferon gamma, and tumor necrosis factor alpha (TNF $\alpha$ ) have been reported in patients with RAS.<sup>3,6</sup> A strong positive family history was found as high as 63% in the 140 young female population with aphthous ulcer indicating the genetic predisposition.<sup>7</sup>

Blood groups have been used as genetic markers in several studies. Genetic factors such as blood group antigens may probably have an influence on the risk, severity and development of some diseases.<sup>8</sup> These blood group antigens are polysaccharides that are seen not only in the red blood cells but also in the epithelial cells.<sup>9</sup> Some diseases are more prevalent in certain blood group individuals while others blood groups remain unaffected. A lot of studies are being carried out to find the association of blood group antigens with diseases that have immune dysregulation in order to determine the probable etiologic predisposition. Since ABO blood group is associated with genetics and immunity, this study was aimed to find a correlation between ABO blood groups and recurrent aphthous stomatitis.

## II. Materials and methods

A cross sectional observational study was carried out among 430 students of Vivekanandha Dental College for Women, Tiruchengode. After obtaining the institutional ethical clearance, each of the student's blood group details were obtained from the college data and every individual was interviewed about their history of RAS. The number of students who participated in the study with their blood group details and history of RAS was entered in Microsoft Excel sheet and descriptive statistics was used to find the percentage distribution of the history of RAS with respect to each blood group. Chi square test was used to find the correlation between ABO blood groups and RAS.

## III. Results

A total of 430 individuals participated in the study. The average age of the study participants ranged from 18 years to 26 years. The positive and negative history of RAS pertaining to the Rh blood group is tabulated in Table 1 and the positive and negative history of RAS pertaining to ABO blood group is tabulated in Table 2.

**Table 1.** Distribution of study participants with respect to presence or absence of RAS and Rh blood group

Rh Status	Positive History of RAS	Negative History of RAS	Total
Rh Positive	250	162	412
Rh Negative	10	8	18
Total	260	170	430

**Table 2.** Association of ABO blood group with RAS

BLOOD GROUP	Recurrent aphthous stomatitis (RAS)					
	Positive History of RAS (N)	%	Negative History of RAS (N)	%	Total	%
A	65	66	33	34	98	23
B	70	58	51	42	121	28
Ab	20	51	19	49	39	9
O	105	61	67	39	172	40
Total	260	60	170	40	430	100
p>0.05						

## IV. Discussion

Recurrent aphthous stomatitis is one of the common condition encountered by the general population and the dentist. Though several factors have been cited in the etiopathogenesis of RAS, the exact etiology still remains unknown.<sup>3,4,7</sup> Blood group antigens are not only expressed on red blood cells but also expressed in epithelial cells and they have been known to play a role in several biological processes including bacterial adhesion, inflammation, cell movement and tissue differentiation.<sup>10</sup> Hence blood group antigens, by playing a role in immunity and genetics could also attribute to the etiopathogenesis of RAS.

In our study among the 430 participants the majority of the participants were Rh positive (Table 1). On comparing the prevalence of RAS among the Rh positive and Rh negative individuals, it was found that the Rh positive students had a slightly higher prevalence of RAS when compared to the Rh negative individuals. This results correlated with another similar study that was done in the Iranian population where among the 50 RAS patients the majority of the patients were found to be Rh positive. But the results were not statistically significant.<sup>11</sup>

On analysing the ABO blood group it was found that the blood group antigen 'O' was more prevalent followed by 'B', 'A' and 'AB' (Table 2). This prevalence distribution of blood groups was very much in correlation with a multicentric study conducted among the Indian population where the 'O' blood group antigen was the most common antigen.<sup>12</sup> Our study did not show any statistically significant correlation between ABO blood group and RAS. However when we look at the percentage distribution, it is seen that highest percentage of positive history of RAS was seen in the 'A' blood group individuals and the least prevalence was found in the 'AB' blood group individuals.

In a study done by Bahramian et al among 75 patients with RAS, it was found that just as in our study, a high prevalence of RAS was found in 'A' blood group individuals and the least was found among 'AB' blood group individuals.<sup>13</sup> In another similar study that was done among 200 study participants, it was found that the 'O' blood group individuals had a higher prevalence of RAS when compared to other blood groups and the least was found among the 'AB' blood group individuals. However their results were not statistically significant.<sup>14</sup>

A study that was conducted among 175 patients in Turkey revealed that the RAS patients had a deficiency in haemoglobin, vitamin B12, folic acid, ferritin and iron. They also studied the association of ABO/Rh blood groups with RAS. They found that the 'B' positive individuals had a six times higher risk of RAS when compared to the 'B' negative individuals and three times higher in 'AB' positive individuals when compared to 'AB' negative individuals.<sup>15</sup> Their study results were in contrary to our study results where the prevalence was more in the A blood group individuals.

A lot of studies have shown that the 'A' blood group antigen was highly prevalent in many disease conditions like gastric, hypopharynx, laryngeal, pancreatic, breast testicular and bone cancers.<sup>16</sup> On taking oral diseases, the 'A' blood group was the most commonly found among the patients with Lichen planus.<sup>8</sup> It is also found that the 'A' blood group individuals have a 1.46 times higher risk of developing oral cancer when compared to other blood groups.<sup>17</sup> In our study also we found that the 'A' blood group individuals commonly suffered from RAS when compared to the others.

## V. Conclusion

Many studies have been done in the past to possibly throw light in the unexplored area of the etiopathogenesis of RAS. ABO blood group is one factor that could be associated with this recurrent painful condition. Although we did not find any statistically significant association between ABO blood group and RAS in our study, a larger study sample is required to validate the hypothesis that ABO blood group antigens could possibly contribute to the etiopathogenesis of RAS.

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Dr. Thangadurai Maheswaran. "Correlation between ABO Blood Group and Recurrent Aphthous Stomatitis among South Indian Population." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 4, 2019, pp 07-09.