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Original Article

ABO and Lewis Blood Grouping with ABH Secretor and Non-secretor Status: A Cross Sectional Study in Dhaka

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Abstract

A cross sectional study was done with 42 apparently healthy persons aged 6 years and above from both sexes. Most of them are blood donors in the department of Transfusion Medicine, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. Few, other than blood donor, were selected from the same locality. Five ml venous blood was collected with all aseptic precautions. ABO blood grouping and Lewis phenotyping were done by tube method. ABO reverse grouping was also done from serum. With all precautions 2 ml of saliva was collected from all subjects. Secretor status was detected from the saliva by haemagglutination inhibition method. ABO blood grouping shows 36% 'O' group, 24% 'A' group, 33% 'B' group and 7% 'AB' group. Distribution of Lewis phenotype are Le(a+b-) 19%, Le(a-b+) 53%, Le(a-b-) 26% and Le(a+b+) 2% only. 60% of study population was ABH secretor and 40% non-secretor.

Keywords: ABO group, Lewis phenotype, ABH secretor status

Introduction

A and B antigens of ABO blood group system are converted from their precursor, H substance. This conversion starts at 5 to 6 weeks of intra-uterine life. Conversion of H substance into either A or B is partial. In case of group O there is no conversion of H substance.

These group specific substances, ABH, are not only confined to red cells but may be detected in most body fluid as soluble form except cerebrospinal fluid. One of the richest and most available source is saliva[1]. That group of people who secrets ABH soluble substances in secretion are known as secretor.

It can be quite useful to determine ABH secretor status as in certain doubtful cases of ABO blood grouping in conventional method, especially the subgroups of ABO system, can be detected by secretor status.

Various disease states seem to alter red cell antigens and result in weaker reaction during forward grouping. Again the isoagglutinin anti-A, anti-B or anti-AB also may be weak or absent in some leukemia and non-hodgkins lymphoma. In such cases saliva studies to detect secretor status may help to confirm the patient's true ABO group if the person is secretor[2].

There are certain diseases which show evidence of association with non-secretor status. ABH non-secretors are reported to have a tendency toward higher factor VIII and vWF with a greater risk for future thrombotic and heart disease[3]. These groups are found to have a significantly higher rate of duodenal ulcer, recurrent urinary tract infection and persistent candida infection[3]. ABH non-secretors are also have an higher prevalence of different verities of auto-immune diseases including ankylosing spondylitis, reactive arthritis, psoriatic arthropathy, Sjogren's syndrome, multiple sclerosis and

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Grave's disease[3]. Thus it is evident that the determination of secretor and non-secretor status of ABH substances has the clinical importance.

As the phenotypes Le(a-b+) and Le(a+b+) are secretor groups, so Lewis phenotyping during determination of ABH secretor status can give rise a definitive result.

Materials and Methods

A total number of 42 persons aged 6 years and above of both sexes with apparently normal health were selected as study population. Most of them were selected randomly from the blood donors, who attended to Transfusion Medicine Department, BSMMU, Dhaka for donation of blood. Few were selected randomly, other than blood donors, from the same locality.

i) Collection and blood grouping

With all proper aseptic precautions 5 ml of venous blood was collected from antecubital vein by disposable syringe. Approximately 3 ml of blood was taken in a dry sterile test tube at room temperature[4]. Serum was separated by centrifugation at 3000 rpm for 30 seconds. Remaining 2 ml was taken in another dry sterile test tube containing anticoagulant, EDTA. It was washed 3 times with isotonic normal saline, and 5% cell suspension was prepared for ABO blood grouping and Lewis phenotyping. For both ABO and Lewis blood grouping tube method was applied[5]. ABO reverse grouping was also done from serum[5]. Phenotypes of O, A, B, and AB of ABO blood group and Le(a+b-), Le(a-b+), Le(a-b-) and Le(a+b+) were recorded.

ii) Collection and processing of saliva

After proper rinsing of mouth with distilled water and discarding first few drops, 2 ml of saliva was collected in a dry sterile container. For processing the saliva was transferred to a test tube and placed in a boiling water bath for 10 minutes to denature the salivary enzymes. It was then cooled and centrifuged for 5 minutes at 1000 g. then supernatant was collected and diluted with an equal volume of normal saline to detect the ABH secretor status by haemagglutination inhibition method5. All the data were recorded.

Results

ABO blood grouping: The frequencies of ABO blood grouping recorded were 36% 'O' group, 24% 'A' group, 33% 'B' group and 7% 'AB' group. Lewis phenotyping: The distribution of Lewis phenotyping were Le(a+b-) 19%, Le(a-b+) 53%, Le(a-b-) 26% and Le(a+b+) 2% only. (Fig-2)

ABH secretor and non-secretor status: The frequency of ABH secretor status (60%) is higher than non-secretor status (40%) among the study population. (Fig-3)

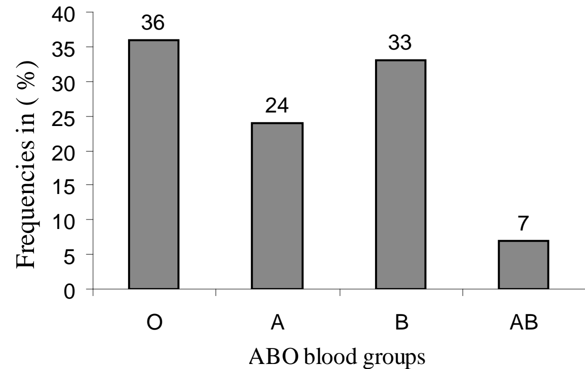

Fig.1: Simple bar diagram showing the frequencies of ABO blood grouping (n=42)

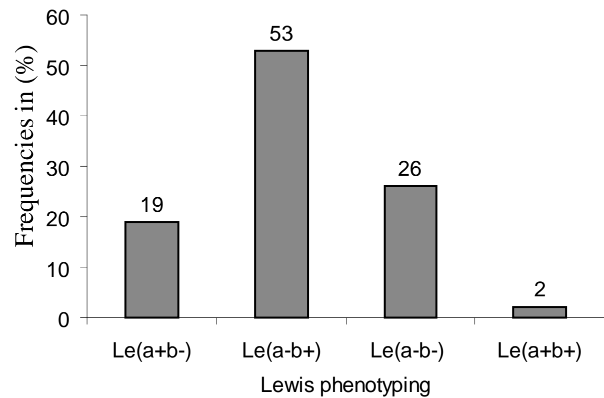

Fig.2: Simple bar diagram showing the freqencies of the Lewis phenotype (n=42)

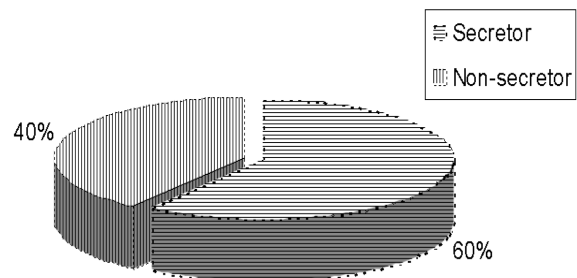

Fig.3: Pie diagram showing the ABH secretor and non-Secretor status among the study population (n-42)

Discussion

In this study the frequency of ABH secretor status is 60%, whereas non-secretor is 40%. As the Le(a-b+) and Le(a+b+) phenotypes are secretor, so the secretor status in Lewis phenotype is 55% (53%+2%). This result is almost similar to the result of ABH secretor status.

In Caucasians approximately 80% are secretor and 20% are non-secretor, and this differs from present study. It may be due to racial variation. But in Negroes 60% are secretor and 40% are non-secretor6 which simulates that in present study.

The frequencies of ABO blood grouping reveal that group 'O', 'A', 'B' and 'AB' are 36%, 24%, 33% and 7% respectively. Rahman, who also studied the ABO grouping in Bangladeshi population, found the frequencies as 33.97%, 22.44%, 35.20% and 8.39% respectively[7]. Thus in both studies the results are similar.

This study reveals that among the total study population Le(a+b-) is 19%, Le(a-b+) 53%, Le(a-b-) 26%, and Le(a+b+) 2%. There is no available literature on Lewis grouping, so far, in Bangladeshi population. But in a similar study in Japan, Nasu, Toshitsugu, Kumon and Hiromi show Le(a+b-) is 20%, Le(a-b+) 68%, Le(a-b-) 12%, and Le(a+b+) nil[8]. On reviewing of both these studies it is found that Le(a-b+) is much higher in Japanese population than that in Bangladeshi. This difference may be due to the higher secretor status among the Japanese population like that in Caucasians. Le(a+b+) phenotype is rare but may be found in some subjects, both whites and blacks. This is due to incomplete conversion of Lea to Leb for the presence of weak secretor gene (Sew)[9]. Probably due to this Sew this study shows only 2% Le(a+b+) phenotype.

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