FREQUENCY OF BLOOD GROUP SUB-TYPE IN PATIENTS WITH ISCHEMIC STROKE AT NISHTAR HOSPITAL MULTAN.

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ABSTRACT... The objective of this study was to determine the blood groups among the patients presenting with ischemic stroke either AB blood group or O blood group is more common (frequent) among these patients irrespective of other known factors responsible for stroke. **Study Design:** Descriptive, Cross-sectional study. **Setting:** Department of Medicine, Nishtar Hospital Multan. **Period:** January 2015 to August 2015. **Materials & Methods:** We included total 292 patients (40-70 years of age), with ischemic stroke documented on CT scan brain of both gender (male and female). Blood sample of these patients were sent to the central laboratory of Nishtar hospital for blood group determination using standard techniques. **Results:** Mean age was 56.26 ± 8.28 years. Out of the 292 patients, 163 (55.82%) were male and 129 (44.18%). Frequency of blood group A, B, AB and O in patients with ischemic stroke was found to be 114 patients having blood group A (39.04%), 53 patients having blood group B (18.15%), 26 patients having blood group AB (8.90%) and 99 patients having blood group O (33.90%) respectively. **Conclusion:** Our study results concluded that there is an association between ABO blood groups and ischemic stroke, irrespective of other risk factors. Our study results have observed that individuals belonging to non-O blood groups (A, B, or AB) are at an increased risk of ischemic stroke as compared to O blood group carriers however we did not control possible impact of confounders such as diabetes, hypertension and dyslipidemia etc. Many studies proved that persons with AB blood groups are at increased of atherosclerosis but no study showed that these persons have increased risk of ischemic stroke or not.

Key words: Atherosclerosis, ABO Blood Groups, Pakistan, Ischemic Stroke.

INTRODUCTION

Stroke is defined as any rapidly developing deficit of a part or whole side of body that persists more than 24 hours.[1] It is either Hemorrhagic or Ischemic that leads to decreased supply of blood and nutrients to that part of brain.[2] Approximately more than 15 million people suffer from stroke all across the world, of which one third of them dies and one third suffers from disability. In developing countries, stroke is the third most common cause of mortality, only coronary heart disease and cancers causes more death than stroke.[3] 85% of all cases of stroke are disagnosed as ischemic sub-type.[4] Study in United States showed that 0.8 million people have stroke each year in United States and as high 82-92% among them were have ischemic stroke.[5] The two major causes of Ischemic Stroke are Atherosclerosis and embolism followed by vasculitis, endocarditis and venous infarcts are the other causes of ischemic stroke.[6,7,8] It is very important to know underlying cause as the subsequent management of each patient depends on the sub type of stroke. The most important diagnostic test is Neuroimaging (CT-Scan brain) in not only in the early diagnosis of stroke type but also further management and treatment of the patient depends on it.[9] If the patient have ischemic stroke tissue plasminogen activator is the treatment of choice provided the patient arrives with 3 hour of symptoms.[10]

ABO Blood group was discovered in 19th century by Landsteiner that is based on presence or absence of the two genes, A & B which produces antigens A & B respectively while absence of such antigen where classified as having blood group O.

This system produced four types of blood groups with O group the most common with 44%, closely followed by A group at 43%, B group is 4% and AB group is 19%.[11] Initially ABO blood group knowledge was only use to avoid reactions during blood transfusion however recent development have studied the role of blood group subtypes in different diseases like atherosclerosis, MI, stroke, diabetes, peptic ulcer and even cancers. Gong P along with other authors in his study noted that there was increase risk of atherosclerosis with non o blood group.[12,13] Sabino AP et al showed that different blood groups behave differently for ischemic stroke and peripheral arterial disease and finding non-O blood group such as A, B or AB were more prevalent in patients with atherosclerosis, MI, Stroke.[14] Hanson E et al[15] in his study also echoed Sabino studied and showed that ischemic stroke is more prevalent in patients with blood group A. While internationally there is ample data but no such study is available in Pakistan.

The rational of this study was to determine which blood groups are more prevalent among patients presenting with ischemic stroke irrespective of other risk factors and further studies can be conducted to figure if specific blood groups can be an associated with ischemic stroke.

MATERIALS & METHODS
This was a descriptive, Cross-sectional study, conducted in the department of medicine, Nishtar Hospital Multan from January 2015 to August 2015 with permission from ethical and Research board of hospital with consent of patients having ischemic stroke of both genders and 40-70 years of age. Those who were having head trauma or hemorrhage on neuro imaging were excluded. Non-probability, Consecutive sampling used by taking following values
$n = z^2 p (1-p)/e^2$ $n = (1.96)^2 0.05(1-0.05)/(0.025)^2 = 292$

Where p=Frequency of ABO blood groups among patients with ischemic stroke =5%.[15] e=margin of error=2.5%.

Of these 292 patients with ischemic stroke admitted to, Nishtar Hospital Multan, fulfilling the inclusion/exclusion criteria was selected. After taking consent, blood samples taken from peripheral vein for blood grouping were sent to the Central Laboratory Nishtar Hospital Multan. Laboratory technician determined blood group using standard techniques. All this information was collected through a self structured Performa.

All data were processed and analyzed using computer based software program SPSS version 22.0 for windows. Numerical variables like age have been presented by calculating as mean and standard deviation. Qualitative data like gender, ABO blood group have been presented by calculating frequency and percentage. Effect modifiers like age, gender and family history of ischemic stroke (yes/no) have been controlled after making stratification tables and post-stratification chi square was applied to see their effect on outcome and P-value ≤0.05 has been taken as significant.

RESULTS
Participants in our study were from age range 40 to 70 years with mean age of 56.26 ± 8.28 years. Majority of the patients 123 (42.12%) were between 51 to 60 years of age as shown in Table-I. Out of the 292 patients, 163 (55.82%) were male and 129 (44.18%) were females with male to female ratio of 1.3:1 (Figure-1).

The prevalence of blood group A, B, AB and O in patients with ischemic stroke was found to be as of following; 114 patients having blood group A (39.04%), 53 patients having blood group B (18.15%), 26 patients having blood group AB (8.90%) and 99 patients having blood group O (33.90%) respectively (Figure-2). When Stratification of blood groups was done on age groups, significant difference was found between different age groups as shown in Table-II while the stratification of blood groups with respect to gender has shown in Table-III which showed no significant difference between male and female. Table IV has shown the stratification of blood groups with respect to family history of ischemic stroke.

Age (in Years)	No. of Patients	%age
40-50	74	25.34
51-60	123	42.12
61-70	95	32.53

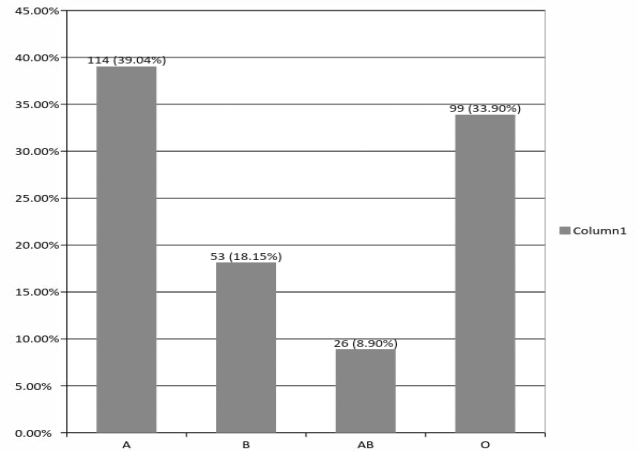**Table-I: Age distribution of patients (n=292).**
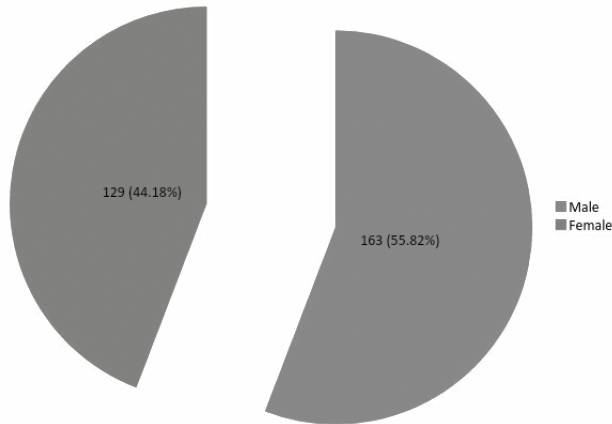
Figure-1. %age of patients according to gender (n=292).

DISCUSSION

Numerous studies have proven that thrombosis is not just a regular process for blood coagulation but it is controlled by genetics and various genetic variants play their role in process of blood coagulation.[16,17]

Figure-2. %age of patients according to ABO blood group (n=292)

This genetic variation and influence is not only limited to structure but function of thrombosis, such as fibrin and other factors for formation and lysis of thrombosis, is also based on it.[18,19] Thrombosis in brain is the leading cause of death and morbidities in developed nations.[16] ABO blood group systems comprises of different antigens which are present on RBS and vascular endothelium, and these blood groups have proven links with procoagulant proteins like factor IV and won villibrand factors and many more, hence playing an important role in thrombus formation.[20-22]

Age (Years)	Blood Group				P-Value
	A	B	AB	O	
40-50	27 (36.49%)	18 (24.32%)	10 (13.51%)	19 (25.68%)	
51-60	50 (40.65%)	43 (34.96%)	06 (4.88%)	24 (19.51%)	0.000
61-70	37 (38.95%)	10 (10.53%)	10 (10.53%)	38 (40.0%)	

Table-II. Stratification of Blood groups with respect to age groups.

Gender	Blood Group				P-Value
	A	B	AB	O	
Male	54 (33.13%)	59 (36.20%)	18 (11.04%)	32 (19.63%)	
Female	60 (46.51%)	40 (31.01%)	08 (6.20%)	21 (16.28%)	0.102

Table-III. Stratification of blood groups with respect to age gender.

Family History	Blood Group				P-Value
	A	B	AB	O	
Yes	64 (45.3%)	20 (14.18%)	19 (13.4%)	38 (26.9%)	
No	50 (33.11%)	33 (21.8%)	07 (4.63%)	61 (40.39%)	0.623

Table-IV. Stratification of blood groups with respect to family history of stroke.

Recent developments have shown blood group system that certain blood groups have increase risk of cerebrovascular events like MI and ischemic stroke and their importance goes beyond just blood transfusion and reaction.[20]

Out of the 292 patients, 163 (55.82%) were male and 129 (44.18%) were females. In literature, various studies have proven that ischemic stroke is more common in male including a study conducted by Luo et al[23] from China which also reports that ischemic stroke is more prevalent in male than in female. Local data also proves the same with a study from Karachi by Sheikh et al[24] stated that 61 % of patients with ischemic stroke were males.

The limitations of the study were our inability to remove all confounding factors. Although we controlled for many risk factors for ischemic stroke, but factors such as smoking status, use of medication, High LDL-C, hypertension status was not taken which might have affected the power of study. A larger multi centric study is required to further consolidate the result of my findings.

Age range in this study was from 40 to 70 years with mean age of 56.26 ± 8.28 years. Majority of the patients 123 (42.12%) were between 51 to 60 years of age. Other similar studies such as Khan et al [25] (58.11 ± 15.29) and Abid et al [26] (55.96 ± 13.75) had a demographic profiles that matched our study.

In our study, frequency of blood group A, B, AB and O was found to be 114 (39.04%), 53 (18.15%), 26 (8.90%) and 99 (33.90%) respectively. Hanson E et al[15] in his study has shown the frequency of blood group A, B, AB and O as 47%, 14%, 5% and 34% respectively in patients of ischemic stroke, results are closer to our study results. He M et al showed that ABO blood type is strongly associated with venous thromboembolism (VTE) and weakly association with myocardial infarction.[27] In a genetic study Wiggins KL proved that hypertensive or post-menopausal woman with the alleles for A and B Blood groups have greater incidence of myocardial infarction, stroke, and VTE risk.[28] Sabino AP et al[14]observed that non-O blood group have greater and more significant association with Ischemic stroke.. Zakai NAet al[13] again showed that AB blood group is associated with increased risk of ischemic stroke. In his study the most prevalent blood group in patients with ischemic stroke was A blood group with 43% followed by Blood Group O (39.6%). Wiggins KL tried to find association between blood group sub type and diseases such as venous thrombosis and ischemic stroke. His result stated that blood group A and B had an increased risk of venous thrombosis and Ischemic stroke in comparison to blood group O.[28] Williams FM along with his colleagues showed that ABO gene variants plays a role in large vessel and cardio embolic stroke but not the small vessel diseas.[29] A meta-analysis comprising of seven studies consisting of patients who had different type of strokes before age 70 stated that there was significantly enhanced of stroke for the patients having non-O blood group as compared with those of having O blood group.[30]

Zhou S et al[31] in his study quality of vWF and FVIII is determined by Locus ABO, hence which in turn determines the risk of VTE in patient. People with blood group O have the lowest risk of VTE.[31] To summarize it can be said that there is an association between ABO blood groups and ischemic stroke, with people with blood group A, B or AB are at greater risk of ischemic stroke compared to those with blood group O.

CONCLUSION
Our study results concluded that there is an association between ABO blood groups and ischemic stroke. Our study results have observed that individuals belonging to non-O blood groups (A, B, or AB) are at an increased risk of ischemic stroke as compared to O blood group carriers however we did not control possible impact of confounders such as diabetes, hypertension and dyslipidemia. Further studies are required to see this observation and to prove this as independent risk factor for ischemic stroke.
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2	Gohar Ali	Analysis, Editing, Data collection.	
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