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Original Article / Orjinal Araştırma

Association between ABO blood group with Parkinson's disease

ABO kan grubunun Parkinson hastalığı ile ilişkisi

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Abstract

Introduction: Parkinson's disease is a common neurodegenerative disease that seen in adulthood. Most prevalent symptoms are resting tremor, rigidity, bradykinesia, gait disturbance, and postural abnormalities. Disorders related with ABO blood group are infectious disease (cholera, *Helicobacter pylori*, and *Echerichia coli*), cardiovascular disease, malignancies and allergic status. We objectived to elucidate the association between ABO blood group and Parkinson's disease.

Methods: We investigated retrospectively the files of 264 adult patients who were diagnosed with Parkinson's disease and had blood type between January 2008 and December 2018 in neurology outpatient clinics included in the study.

Results: Distribution of blood groups in patients as follows: ARh(+): 94 (35.6%), ARh(-): 15 (5.7%), BRh(+): 44 (16.7%), BRh(-): 8 (3%), ABRh(+): 18 (6.8%), ABRh(-): 4 (1.5%), 0Rh(+): 71 (26.9%), 0Rh(-): 10 (3.8%).

Discussion and Conclusion: When we consider the pathogenesis of Parkinson's disease, we think of the antigenic structure of blood groups may be effective in this process.

Keywords: ABO; blood group; Parkinson's disease.

Özet

Amaç: Parkinson hastalığı, erişkinlikte görülen yaygın bir nörodejeneratif hastalıktır. En sık görülen semptomlar, tremor, rijidite, bradikinezi, denge bozukluğu ve postural anormalliklerdir. ABO kan grubuyla ilgili hastalıklar; bulaşıcı hastalıklar (kolera, *Helicobacter pylori*, *Echerichia coli*), kardiyovasküler hastalıklar, maligniteler ve alerjik durumlardır. Çalışmamızda ABO kan grubu ile Parkinson hastalığı arasındaki ilişkiyi araştırmayı amaçladık.

Gereç ve Yöntem: Çalışmada Ocak 2008–Aralık 2018 tarihleri arasında nöroloji polikliniğine başvurup Parkinson hastalığı tanısı alan ve kan grubu bakılmış 264 erişkin hasta dahil edildi. Hastaların dosyaları geriye dönük olarak hastane bilgi sisteminden tarandı.

Bulgular: Hastalarda kan gruplarının dağılımı şöyle idi: ARh(+): 94 (%35,6), ARh(-): 15 (%5,7), BRh(+): 44 (%16,7), BRh(-): 8 (%3), ABRh(+): 18 (%6,8), ABRh(-): 4 (%1,5), 0Rh (+): 71 (%26,9), 0RH(-): 10 (%3,8).

Sonuç: Parkinson Hastalığının patogenezini göz önüne aldığımızda, kan gruplarının antijenik yapısının bu süreçte etkili olabileceğini düşünüyoruz.

Anahtar Sözcükler: ABO; kan grubu; Parkinson hastalığı.

Parkinson's disease (PD) is a common neurodegenerative disorder that seen in adulthood. Most prevalent symptoms are resting tremor, rigidity, bradykinesia, gait disturbance, and postural abnormalities. The pathogenesis of Parkinson's disease cannot be clearly elucidated. Its proposed that deterioration of dopaminergic neural cells is a multifactorial process. At the present time intracellular-mitochondrial, extracellular and inflammatory/cytokine-related mechanisms are accused of the occurrence of this disease.[1,2]

Blood groups first identified in 1900s. Currently there are 36 known blood group systems. Most clinically important are ABO and Rh. Blood group antigens are found on red blood cells, platelets, leukocytes, plasma proteins, certain tissues, and various cell surface enzymes, and also exist in soluble form in body secretions such as breast milk, seminal fluid, saliva, sweat, gastric secretions, urine, and amniotic fluid.[3] ABO blood groups were suggested to be related with several diseases. Disorders related with ABO blood group are infectious disease (cholera, *Helicobacter pylori*, and *Echerichia coli*), cardiovascular disease, malignancies and allergic status.[4–6]

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Table 1. Distribution of Patients' blood groups according to gender

Gender	Blood group																Total
	ARh+		ARh-		BRh+		BRh-		ORh+		ORh-		ABRh+		ABRh-		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Female	48	39	7	5.7	16	13	4	3.3	34	27.6	4	3.3	8	3.03	2	0.75	123
Male	46	32.6	8	5.7	28	19.9	4	2.8	37	26.2	6	4.3	10	3.78	2	0.75	141

Tablo 2. ABO blood group comparison according to gender

Gender	ABO	Results		Control study		p
		n	%	n	%	
Female	A	55	44.7	493	35.9	0.052
	O	38	30.9	505	36.8	0.192
	B	20	16.3	273	19.9	0.865
	AB	10	8.1	100	7.3	0.745
	Total	123	100.0	1.373	100.0	
Male	A	54	38.3	52.445	38.9	0.884
	O	43	30.5	49.914	37.1	0.105
	B	32	22.7	22.822	16.9	0.066
	AB	12	8.5	9.304	6.9	0.063
	Total	141	100.0	134.665	100.0	

Tablo 3. Rh groups comparison according to gender

Gender	Rh	Results		Control study		p
		n	%	n	%	
Female	Rh positive	106	86.2	1196	87.20	0.751
	Rh negative	17	13.8	175	12.80	0.751
	Total	123	100.0	1371	100.0	
Male	Rh positive	121	85.8	120.902	89.90	0.106
	Rh negative	20	14.2	13.583	10.10	0.106
	Total	141	100.0	134.485	100.0	

Factors that play role in making relation between ABO blood group and disease are cell adhesion molecules: carbohydrates, glycosylphosphatidylinositol-anchored proteins, and transmembrane proteins, carbohydrate-based antigens,[4,7] which stimulate the inflammatory process.

There is no enough research to show the relation of ABO blood group and Parkinson's disease. We aimed to explore the link of ABO blood group type with Parkinson's disease.

Materials and Method

We retrospectively searched 264 adult patients' file who were diagnosed with Parkinson's disease and had blood type between January 2008 and December 2018 in neurology outpatient clinics. The age, gender, and blood group of the patients scanned and recorded retrospectively from the hospital data system. There were no missing data. Yıldız's study results used as a control study.[8]

Our study is a descriptive study and there were no exclusion criteria. Blood groups of cases assessed by the INVITROGEL test system, MTC, Germany.

This study accepted by local ethics committee with the number: 022019/1829.

Normality of the distribution of the continuous variables was determined by the Kolmogorov–Smirnov test. Continuous variables with normal distribution were expressed as mean±SD. Variables with skew distribution were expressed as median (minimum–maximum), and categorical variables were expressed as percentage. We performed a chi-squared test for the comparison of two proportions (from independent samples), expressed as a percentage. Statistical analysis was performed with MedCalc Statistical Software version 18.11.3 (MedCalc Software bvba, Ostend, Belgium; https://www.medcalc.org; 2019) and SPSS 15.0 for Windows. P value <0.05 was accepted as statistically significant.

Results

We analysed 264 adult patients (Age: median 78.5, minimum 35, maximum 90 years old), 123 of whom were female (46,6%), and 141 of whom were male (53.4%). Distribution of blood groups in patients as follows: ARh(+): 94 (35.6%), ARh(-): 15 (5.7%), BRh(+): 44 (16.7%), BRh(-): 8 (3%), ABRh(+): 18 (6.8%), ABRh(-): 4 (1.5%), 0Rh(+): 71 (26.9%), 0Rh(-): 10 (3.8%) (Table 1). When we compare ABO blood groups and Rh groups according to gender there was not statistically significance between our study results and control study results (Tables 2, 3). Comparison of total numbers in ABO groups and Rh status, 0 blood group and Rh status ratio was lower than the control study ($p<0.032$, $p<0.036$) (Tables 4, 5).

Discussion

We found that in our study ARh(+) blood group was most prevalent blood group in Parkinson's disease patients. Although the relation between ABO blood groups and different diseases was investigated in several animal and human studies, there are very few and conflicting studies about the

Tablo 4. Comparison of total numbers in ABO groups

ABO group	Results		Control study		p
	n	%	n	%	
A	109	41.3	52918	38.90	0.424
O	81	30.7	50606	37.10	0.032*
B	52	19.7	23127	17	0.242
AB	22	8.3	9387	6.9	0.370
Total	264	100.0	136.038	100	

Tablo 5. Comparison of total numbers in Rh status

Rh	Results		Control study		p
	n	%	n	%	
0 Rh positive	227	86.0	122.298	89.90	0.036*
Rh negative	37	14.0	13.740	10.10	0.036*
Total	264	100.0	136.038	100.0	

relation between ABO blood groups with Parkinson's disease and neurodegenerative disease. As shown in cardiovascular disease pathogenesis, high levels of von Willebrand factor (vWF), coagulation factor VIII (FVIII) are also associated with neurodegenerative disease pathogenesis.[9–11] Non –O blood groups have high VWF and FVIII levels than O-blood group.[12] Thus it can be said that the O-blood group has a protective effect from ischemic events and therefore neurodegeneration.[13] In our study O-blood group ratio was lower than the control study ($p<0.032$). Most large scaled study about Blood group and neurodegenerative disease is conducted by Senthil K Vasan et al. showed no link between blood type and neurodegenerative disease.[14] Renvoize and colleagues reached same conclusion on a study in patients with Alzheimer's disease.[15] However Alexander et al.'s cohort study concluded there is statistically significant relation between blood group AB and cognitive disorders.[16] Chia et al. from Taiwan showed B type blood group is linked with Parkinson's disease.[17] In our study ARh(+) blood group was common in Parkinson's disease. The higher incidence of A type blood group in Turkish community may be associated with more prevalence in patients with Parkinson's disease.

We think that to show a confident relation between Parkinson's disease and blood group type there is a need for large scaled, immunological and genetically based studies in the future.

Conclusion

When we consider the pathogenesis of Parkinson's disease, we think of the antigenic structure of blood groups may be effective in this process.

Compliance with Ethical Standards: The study protocol was in accordance with the Declaration of Helsinki, and was approved by local ethics committee with the number: 022019/1829.This study was not funded by any person or company or institution. The authors declare that there is no conflict of interest regarding the publication of this article. Our research designed as a retrospective file review and it is not involving human participants and/or animals.

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