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Orgınal Article

Relationship Between Primary Tumor, Metastasis and Blood Type in Patients with Malignancy Receiving Palliative Care

Palyatif Bakim Alan Malignansli Hastalarda Primer Tümör, Metastaz ve Kan Tipi Arasindaki İlişki

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Highlights

- Patients with blood group A had a lower incidence of CNS and breast cancers than patients with other blood groups
- There was no relation between metastases status and ABO/Rh blood groups.

Abstract

Background: The blood type is known to be associated with the risk of cancer. This study aimed to evaluate the relationship between oncological diagnoses and blood groups of inpatients receiving palliative care. **Material and methods:** This retrospective study was conducted with patients receiving palliative care at our hospital between December 2019 and December 2020. The records of patients receiving comprehensive palliative care during this 1-year period were obtained from the hospital archive, and patients diagnosed with a malignant disease were included in the study. **Results:** Overall, 176 patients were included in the study. No association was found between the cancer type and ABO/Rh blood groups. The incidence of central nervous system (CNS) and breast cancers was lower in patients with blood group A than in those with other blood groups ($p = 0.028$). Moreover, the focus and site of metastasis and the ABO/Rh blood group were not related. In addition, the comparisons between blood groups in terms of the presence and site of metastasis revealed no significant relationship. **Conclusions:** Patients with blood group A had a lower incidence of CNS and breast cancers than patients with other blood groups, and there was no relation between metastases status and ABO/Rh blood groups.

Keywords: Tumor, Metastasis, Blood Group, Palliative Care

ÖZ

Amaç: Kan grupları kanser riski ile ilişkilendirilmektedir. Bu çalışmanın amacı, ilgili serviste yatarak tedavi gören hastaların onkolojik tanılarının kan grupları ile ilişkisini değerlendirmektir. **Gereç ve Yöntem:** Çalışma retrospektif veri taramasına dayalıdır. Kapsamlı palyatif bakım servisine Aralık 2019- Aralık 2020 tarihleri arasındaki 1 yıllık süreçte yatışı olan hastaların kayıtları hastane arşivi vasıtası ile incelenmiştir. Herhangi bir malignansi tanısı olan hastalar veri setini oluşturmuştur. **Bulgular:** Totalde 176 hasta çalışmaya dahil edilmiştir. Kanser çeşidinin kan grubu ve Rh ile ilişkisi bulunmamıştır. A kan grubuna sahip olanlarda diğer kan gruplarına kıyasla SSS ve meme kanseri görülme sıklığının daha düşük olduğu görülmüştür ($p=0,028$). Metastaz varlığı ve odağının kan grubu ve Rh ile ilişkisi bulunmamıştır. Metastaz varlığı ve odağı açısından kan grupları kendi arasında kıyaslandığında anlamlı bir ilişki saptanmamıştır. **Sonuç:** A kan grubuna sahip olanlarda diğer kan gruplarına kıyasla SSS ve meme kanseri görülme sıklığının daha düşük olduğu görülmüştür. Metastaz durumunun ise kan grubu ve Rh ile ilişkisi bulunmamıştır.

Anahtar Kelimeler: Tümor, Metastaz, Kan Grubu, Palyatif Bakım

Introduction

Globally, malignancy is recognised as one of the leading causes of death. Cancer is known to develop because of the interaction between genetic and environmental factors. Moreover, most cancers are caused by environmental factors, and some of these factors include smoking, diet, obesity, radiation and infections (1-3). Although hereditary cancers are rare, some blood groups have been associated with an increased risk of such cancers (2,3).

ABO blood groups are inherited through genes on chromosome 9q34, and this chromosome encodes glycotransferases that catalyse the transfer of nucleotide donor sugars onto the H antigen to form the ABO blood group antigens. The A allele encodes a glycosyltransferase that causes the binding of α-N-acetylgalactosamine to the D-galactose end of the H antigen, thereby producing the A antigen (2). Many hypotheses on the relationship between the blood group and the risk of developing cancer have been proposed; however, there is no established mechanism for the same (1-5).

This study aimed to evaluate the relationship between oncological diagnoses and blood groups of inpatients receiving palliative care.

Materials and methods

Subjects

This retrospective study was conducted with patients receiving palliative (n=176) care at our hospital between December 2019 and December 2020.

The comprehensive palliative care unit of our hospital has a capacity of 24 beds and cares for approximately 5000 adult patients, including those registered with the home health services of the provincial health directorate and those who are not registered with these services but are being treated at various clinics within our hospital. A significant proportion of the patients treated in this unit have terminal-stage malignancies.

The records of patients receiving comprehensive palliative care during this 1-year period were obtained from the hospital archive, and patients with a diagnosis of any malignant disease were included in the study. Patients with an unknown blood group or missing information were excluded from the study. Moreover, patients with repeated admissions were evaluated only once based on the most recent admission. In these patients, age, diagnosis, place of birth, place of residence, addictive habits, personal and family history and metastases were examined. The included patients were not requested to undergo any additional tests, and personal details, such as name and Turkish Identification Number, were kept confidential.

Statistical analysis

All data were analysed using the SPSS version 20.0 software. Categorical variables were presented as number and percentage. For categorical variables, the chi-square test was used to determine the relationship between the groups. A p-value of <0.05 was considered statistically significant in all analyses.

Results

In total, 63.64% of patients were men, 35.80% had blood group A Rh(+), 82.82% had Rh(+) blood group, 34.66% had respiratory system cancer, 76.70% had metastatic disease and 50.41% had a family history of cancer (Table 1). There was no relationship between cancer type ($p = 0.092$) and ABO/Rh blood group ($p = 0.053$) (Table 2). The incidence of central nervous system (CNS) and breast cancers was lower in those with blood group A than in those with other blood groups ($p = 0.028$) (Table 3). There was no relationship between the presence and site of metastases and the ABO/Rh blood groups ($p > 0.05$ for all) (Table 4). Moreover, the comparisons between blood groups in terms of the presence and site of metastasis revealed no significant relationship ($p > 0.05$ for all) (Table 5).

Table 1. Demographic data

		n	%
Gender	Female	64	(36.36)
	Male	112	(63.64)
Place of birth	Samsun	136	(77.27)
	Other provinces	40	(22.73)
Blood group	A Rh+	63	(35.80)
	A Rh−	14	(7.95)
	B Rh+	10	(5.68)
	B Rh−	2	(1.14)
	AB Rh+	8	(4.55)
	AB Rh−	3	(1.70)
	O Rh+	55	(31.25)
	O Rh−	8	(4.55)
	Unknown	13	(7.39)
Blood group	O	63	(38.65)

	A	77	(47.24)
	B	12	(7.36)
	AB	11	(6.75)
Rh	–	28	(17.18)
	+	135	(82.82)
Cancer type	Respiratory system	61	(34.66)
	Central nervous system	9	(5.11)
	Urogenital	25	(14.20)
	Gastrointestinal system	71	(40.34)
	Breast	10	(5.68)
	Other	0	(0.00)
Metastasis	No	41	(23.30)
	Yes	135	(76.70)
Focal metastasis	No	41	(23.30)
	One	63	(35.80)
	More than one	72	(40.90)
Family history	Positive	61	(50.41)
	Negative	60	(49.59)
Smoking	Yes	45	(38.46)
	No	45	(38.46)
	Previous history of smoking	27	(23.08)
Occupation	Not working/Unemployed	36	(30.77)
	White collar	11	(9.40)
	Blue collar	70	(59.83)

Table 2. The relationship between cancer type and ABO/Rh blood group

		Cancer type										P
		Respiratory system		Central nervous system		Urogenital		Gastrointestinal system		Breast cancer		
		n(%)	%95 CI	n (%)	%95 CI	n (%)	%95 CI	n (%)	%95 CI	n (%)	%95 CI	
Blood group	**0**	20(37.74)	(25.62-51.15)	3(33.33)	(10.42-65.22)	7(28.00)	(13.49-47.28)	25(37.88)	(26.9-49.9)	8(80.00)	(49.72-95.59)	0.053
	A	25(47.17)	(34.18-60.46)	2(22.22)	(4.93-54.38)	16(64.00)	(44.49-80.47)	33(50.00)	(38.15-61.85)	1(10.00)	(1.1-38.13)	
	B	3(5.66)	(1.62-14.34)	2(22.22)	(4.93-54.38)	1(4.00)	(0.44-17.21)	6(9.09)	(3.88-17.78)			
	AB	5(9.43)	(3.69-19.45)	2(22.22)	(4.93-54.38)	1(4.00)	(0.44-17.21)	2(3.03)	(0.63-9.37)	1(10.00)	(1.1-38.13)	
Rh	-	10(18.87)	(10.14-30.89)	4(44.44)	(17.3-74.59)	6(24.00)	(10.69-42.94)	7(10.61)	(4.87-19.7)	1(10.00)	(1.1-38.13)	0.092
	+	43(81.13)	(69.11-89.86)	5(55.56)	(25.41-82.7)	19(76.00)	(57.06-89.31)	59(89.39)	(80.3-95.13)	9(90.00)	(61.87-98.9)	

Chi-square test

Table 3. Comparison between blood groups according to cancer type

	Cancer type										P
	Respiratory system		Central nervous system		Urogenital		Gastrointestinal system		Breast cancer		
	n(%)	%95 CI	n(%)	%95 CI	n(%)	%95 CI	n(%)	%95 CI	n(%)	%95 CI	
Blood group 0	20(37.74)	(25.62-51.15)	3(33.33)	(10.42-65.22)	7(28)	(13.49-47.28)	25(37.88)	(26.9-49.9)	8(80)	(49.72-95.59)	0.073
Other groups	33(62.26)	(48.85-74.38)	6(66.67)	(34.78-89.58)	18(72)	(52.72-86.51)	41(62.12)	(50.1-73.1)	2(20)	(4.41-50.28)	
Blood group A	25(47.17)	(34.18-60.46)	2(22.22)	(4.93-54.38)	16(64)	(44.49-80.47)	33(50)	(38.15-61.85)	1(10)	(1.1-38.13)	0.028
Other groups	28(52.83)	(39.54-65.82)	7(77.78)	(45.62-95.07)	9(36)	(19.53-55.51)	33(50)	(38.15-61.85)	9(90)	(61.87-98.9)	
Blood group B	3(5.66)	(1.62-14.34)	2(22.22)	(4.93-54.38)	1(4)	(0.44-17.21)	6(9.09)	(3.88-17.78)	-	-	0.327
Other groups	50(94.34)	(85.66-98.38)	7(77.78)	(45.62-95.07)	24(96)	(82.79-99.56)	60(90.91)	(82.22-96.12)	10(100)	-	
Blood group AB	5(9.43)	(3.69-19.45)	2(22.22)	(4.93-54.38)	1(4)	(0.44-17.21)	2(3.03)	(0.63-9.37)	1(10)	(1.1-38.13)	0.203
Other groups	48(90.57)	(80.55-96.31)	7(77.78)	(45.62-95.07)	24(96)	(82.79-99.56)	64(96.97)	(90.63-99.37)	9(90)	(61.87-98.9)	

Chi-Square Test

Blood group A- Other groups P values	**Central nervous system**	**Urogenital**	**Gastrointestinal system**	**Breast cancer**
Respiratory system	0.163	0.165	0.759	0.029
Central nervous system		**0.031**	0.117	0.466
Urogenital			0.232	0.004
Gastrointestinal system				0.018

Table 4. The relationship between the presence and focus of metastasis and the ABO/Rh blood group

		Metastasis				p	Focal metastasis						p
		Negative		Positive			Negative		One		More than one		
		n (%)	%95 CI	n (%)	%95 CI		n (%)	%95 CI	n (%)	%95 CI	n (%)	%95 CI	
Blood group	0	18(47.37)	(32.17-62.95)	45(36)	(27.98-44.66)	0.473	18(47.37)	(32.17-62.95)	21(35.59)	(24.3-48.26)	24(36.36)	(25.54-48.35)	0.822
	A	16(42.11)	(27.46-57.9)	61(48.8)	(40.15-57.51)		16(42.11)	(27.46-57.9)	30(50.85)	(38.31-63.31)	31(46.97)	(35.28-58.92)	
	B	3(7.89)	(2.27-19.59)	9(7.2)	(3.62-12.73)		3(7.89)	(2.27-19.59)	4(6.78)	(2.33-15.32)	5(7.58)	(2.95-15.81)	
	AB	1(2.63)	(0.29-11.65)	10(8)	(4.19-13.73)		1(2.63)	(0.29-11.65)	4(6.78)	(2.33-15.32)	6(9.09)	(3.88-17.78)	
Rh	-	7(18.42)	(8.64-32.8)	21(16.8)	(11.04-24.08)	0.817	7(18.42)	(8.64-32.8)	10(16.95)	(9.06-27.98)	11(16.67)	(9.19-26.99)	0.973
	+	31(81.58)	(67.2-91.36)	104(83.2)	(75.92-88.96)		31(81.58)	(67.2-91.36)	49(83.05)	(72.02-90.94)	55(83.33)	(73.01-90.81)	

Chi-Square Test

Table 5. Comparison between blood groups according to the presence and focus of metastasis

	Metastasis				p	Focal metastasis						p
	Negative		Positive			Negative		One		More than one		
	n (%)	%95 CI	n (%)	%95 CI		n (%)	%95 CI	n (%)	%95 CI	n (%)	%95 CI	
Blood group 0	18(28.6)	(18.6-40.5)	45(71.4)	(59.5-81.4)	0.208	18(28.6)	(18.6-40.5)	21(33.3)	(22.6-45.5)	24(38.1)	(26.9-50.4)	0.450
Other groups	20(20)	(13.1-28.6)	80(80)	(71.4-86.9)		20(20)	(13.1-28.6)	38(38)	(28.9-47.8)	42(42)	(32.7-51.8)	
Blood group A	16(20.8)	(12.9-30.8)	61(79.2)	(69.2-87.1)	0.469	16(20.8)	(12.9-30.8)	30(39.0)	(28.6-50.1)	31(40.3)	(29.8-51.4)	0.700
Other groups	22(25.6)	(17.3-35.5)	64(74.4)	(64.5-82.7)		22(25.6)	(17.3-35.5)	29(33.7)	(24.4-44.1)	35(40.7)	(30.8-51.3)	
Blood group B	3(25)	(7.6-52.9)	9(75)	(47.1-92.4)	0.886	3(25)	(7.6-52.9)	4(33.3)	(12.5-61.2)	5(41.7)	(18.1-68.8)	0.976
Other groups	35(23.2)	(17-30.4)	116(76.8)	(69.6-83)		35(23.2)	(17-30.4)	55(36.4)	(29.1-44.3)	61(40.4)	(32.8-48.4)	
Blood group AB	1(9.1)	(1-35.3)	10(90.9)	(64.7-99)	0.248	1(9.1)	(1-35.3)	4(36.4)	(13.7-65.2)	6(54.6)	(27.0-80.0)	0.450
Other groups	37(24.3)	(18.1-31.6)	115(75.7)	(68.4-82.0)		37(24.3)	(18.1-31.6)	55(36.2)	(28.9-44.0)	60(39.5)	(32.0-47.4)	

Chi-square test

Discussion

The relationship between blood group and cancer type has been investigated in several epidemiological studies (1-5). However, the studies investigating the relationship between metastasis and blood groups are limited. Therefore, we believe that the results of the present study conducted at the palliative care unit will contribute to the literature and provide up-to-date data.

A previous study compiled the distribution of ABO and Rh (D) groups over 6 years in Istanbul (Turkey's most populous province) and analysed more than 100,000 blood donors (4). The study found that approximately 42% of the participants had blood group A, 35% had blood group O, 15% had blood group B and 8% had blood group AB; moreover, a total of 85% of the participants had a Rh (D)-positive blood group (4). In addition, Salduz et al. (2015) investigated blood groups in Istanbul and reported similar results (5). Remarkably, the distribution of ABO/Rh blood groups in the present study was consistent with that reported in the relevant literature. This suggests that the higher number of patients with blood groups A and Rh (+) is due to the blood group distribution of the study population rather than a specific finding of malignancy.

It has been reported that the incidence of gastrointestinal cancer is higher in people with blood group A and lower in people with blood group O. Moreover, some studies have reported that blood group A increases the risk of developing breast cancer and that patients with blood group O demonstrate better prognosis (1-3). Wolpin et al. compared ABO genotypes using data from 12 prospective cohorts and found that compared to patients with blood group O, an increased probability of pancreatic cancer is observed in patients with blood groups A, AB and B (6). In addition, Iodice et al. reported that in patients with exocrine pancreatic cancer, blood group O was detected at a lower rate than the other blood groups; however, there was no significant difference in blood groups of patients with endocrine pancreatic, other gastrointestinal, breast, prostate and blood cancers (1). According to a study conducted in Taiwan, where the most common blood group is O, when all cancer types were examined together, blood groups AB and A were found to be more common in men and women, respectively, among patients with cancer. This positive relationship is mainly due to lung

and gastrointestinal cancer in men and liver and gastrointestinal cancer in women (2). A case-control study conducted in China reported an increased risk of hepatocellular carcinoma in men with blood group A and chronic hepatitis B (7). Regarding other studies conducted in Turkey with similar geographical and hereditary characteristics, a multicentre retrospective study by Urun et al. reported that the risk of lung cancer was higher in patients with non-O blood groups (8). Tam et al. reported that the incidence of thyroid malignancy was higher in patients with blood group A (9). However, Gömeç and Özden reported no significant relationship between any cancer type and blood group (10). Because of the advances in transportation, industrialisation and technology as well as increased mobility and migration around the world, changes in population groups and blood types are currently more common. The distribution of blood groups is one of the strongest evidences of population mixing in humans (11). The palliative care unit at our hospital cares for patients from the Black Sea region, and these patients mainly reside in Samsun. In the present cross-sectional study, we observed that the incidence of CNS and breast cancers decreased in patients with blood group A. This finding is inconsistent with the literature (1-3), and further cohort or case-control studies are needed to validate these findings.

Kahramanca et al. examined blood group characteristics of patients with colon cancer, and they found a significant relationship between ABO blood groups and susceptibility to liver metastases (12). The susceptibility was more common in patients with blood group A, but it was not associated with Rh antigen (12). Nakagoe et al. reported that the risk of lymph node metastasis was increased in patients with blood group A and colorectal cancer (13). Moreover, some studies have reported that Rh antigen positivity is associated with liver metastasis in patients with colorectal cancer and lymph node metastasis in patients with breast cancer (3,14). However, in the present study, the presence and focus of metastases were not associated with blood group and Rh.

The single-centre design and inability to comprehensively analyse the risk factors were some of the limitations of the current study. The limited sample size was another limitation.

Conclusions

Patients with blood group A had a lower incidence of CNS and breast cancers than patients with other blood groups. Moreover, there was no relation between metastases status and ABO/Rh blood groups. Future studies with larger participation may shed light on this issue.

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References

1. Iodice S, Maisonneuve P, Botteri E, et al. ABO blood group and cancer. Eur J Cancer. 2010; 46(18):3345-50. doi: 10.1016/j.ejca.2010.08.009.
2. Hsiao LT, Liu NJ, You SL, et al. ABO blood group and the risk of cancer among middle-aged people in Taiwan. Asia-Pacific Journal of Clinical Oncology. 2015; 11: 31–6
3. Parlak Ö, Kocaöz S. Meme Kanseri Hastalarında ABO ve Rhesus Kan Grubunun Klinikopatolojik Etkisi: Retrospektif Çalışma. Ankara Med J. 2019; 1:152-6 DOI: 10.17098/amj.542143.
4. Yanasik M, Tunc T, Huslu M, et al. The overall distribution of ABO and Rh (d) groups in the most populous city Istanbul as representing the complex ethnicity of Turkey. Med J Bakirkoy. 2020; 16(4):363-8.
5. Salduz ZİY, Çetin G, Karatoprak C, et al. ABO and Rh Blood Distribution in İstanbul Province (Turkey). İstanbul Med J. 2015; 16: 98-100.
6. Wolpin BM, Kraft P, Gross M, et al. Pancreatic cancer risk and ABO blood group alleles: results from the pancreatic cancer cohort consortium. Cancer Res. 2010; 70:1015–23.
7. Li Q, Yu CH, Yu JH et al. ABO blood group and the risk of hepatocellular carcinoma: a case-control study in

patients with chronic hepatitis B. PLoS ONE. 2012; 7: e29928.

8. Urun Y, Utkan G, Cangir AK, et al. Association of ABO blood group and risk of lung cancer in a multicenter study in Turkey. Asian Pac J Cancer Prev. 2013; 14: 2801–3.
9. Tam AA, Özdemir D, Fakı S, et al. ABO Blood Groups, Rh Factor, and Thyroid Cancer Risk: To 'B'or Not to 'B'. Endocrine research. 2020; 45(2):137-46.
10. Gömeç M, Özden H. Distribution of AB0 and Rh blood groups in cancer patients; is A Rh (+) blood group a risk factor in colorectal cancer development? Cumhuriyet Medical Journal. 2021; 43(2): 182-8.
11. Akın G, Dostbil N. Türkiye'de Kan Grubu Araştırmaları. Ankara Üniversitesi Dil ve Tarih-Coğrafya Fakültesi Dergisi. 2005; 45: 2: 1-15.
12. Kahramanca Ş, Anuk T, Yıldırım AC, et al. Blood Group Characteristics in Colorectal Cancers. Türk Kolon ve Rektum Hastalıkları Dergisi. 2018; 28(2): 76-9. 10.4274/tjcd.00378
13. Nakagoe T, K Fukushima, A Nanashima, et al. Comparison of the expression of ABH/Lewis-related antigens in polypoid and non-polypoid growth types of colorectal carcinoma. J Gastroenterol Hepatol. 2001; 16:176-83.
14. Halvorsen TB. ABO blood groups, rhesus types, and colorectal adenocarcinoma. A retrospective study of 747 cases. Scand J Gastroenterol. 1986; 21(8):979-83.