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The Prognostic Role of AB0 Blood Groups In Pancreas Cancer

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ABSTRACT

Previous studies have reported the relationship between the risk of developing pancreatic cancer and blood groups. There have been conflicting results with respect to the prognostic significance of the AB0 blood group in pancreas cancer. We aimed to evaluate the impacts of blood groups on prognosis in our pancreatic cancer patient population.

Patients diagnosed with pancreas cancer between January 2014 and December 2018 were analyzed retrospectively. We analyzed the prognostic significance of AB0 blood groups for PDAC (pancreatic ductal adenocarcinoma) patients based on stages of the disease (early stage, locally advanced stage, and metastatic).

We evaluated 366 patients diagnosed with pancreatic cancer. The median age of the patients was 65 (27-83). The median overall survival (OS) was 11 months (95%9.49-12.50 months). Median survival based on blood groups were as follows: 13 months for blood group A (95% Cl, 10.59-15.41), 11 months for blood group B (95% Cl, 8.80-13.19), 12 months for blood group AB (95% 6.63-17.36), and eight months for blood group 0 (95% Cl, 5.43-10.56) ($p = 0.171$). 304 (83.3%) of the patients were not alive at the end of the study. We concluded that the survival of those with 0 blood group was shorter in patients with metastatic pancreatic cancer ($p < 0.001$), taking into account the relationship between stages and blood groups.

There was no prognostic effect of AB0 blood groups on pancreatic cancer in our patient group. However, we found that blood group 0 negatively affected OS in metastatic pancreas cancer patients, based on the subgroup analysis according to stages.

Keywords: Pancreatic Cancer, AB0 Blood Group, Prognosis, Metastasis

Introduction

Blood groups are characterized by small carbohydrate epitopes depending on the presence or absence of "A" and "B" genes that surfaced on the red blood cells (1). The expression of AB0 antigens is not limited to red blood cells. They are also expressed in platelets, vascular endothelial cells, mucous secretions, and epithelial tissues. This explains that different blood types are linked with an elevated risk of disease (2). Studies have shown that blood groups are associated with cardiovascular disease, venous thromboembolism, infectious diseases, and cancer (3, 4, 5).

The exact role of AB0 alleles play in cancer development remains uncertain. Various studies showed that tumor cell adhesion, membrane signaling, and host immune response of AB0 antigens emerge as a result of interactions between AB0 alleles and inflammatory markers (6, 7).

There are numerous studies on AB0 blood groups in cancer biology literature. It is now widely accepted that AB0 antigens are associated with the risk of developing gastric cancer (8, 9). Mao et al. concluded that blood types A and AB elevated the risk for gastric cancer (10). On the other hand, regarding pancreas cancer, studies have shown that blood type 0 seems to be protective against cancer development (11, 19).

Several studies have investigated the role that AB0 blood groups play in the prognosis of pancreatic cancer, where they have reached contradicting results in this regard (12, 13, 14). This research aimed to determine the effect of blood groups on overall survival in our patient group.

Materials and Methods

Patients in the medical oncology departments of two hospitals were included in the study. We

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Table 1. Pancreatic cancer patients' baseline characteristics based on the stages

Variables	Early Stage	Locally Advanced	Metastatic	P
	N:132	N:29	N:205	
Blood Groups				0.784
A	70(53.0%)	18(62.1%)	104(50.7%)	
B	19(14.4%)	3(10.3%)	37(18.0%)	
AB	9(6.8%)	2(6.9%)	19(9.3%)	
0	34(25.8%)	6(20.7%)	45(22.0%)	
Sex				0.407
Female	55(%41.7%)	10(%34.5%)	71(34.6%)	
Male	77(%58.3%)	19(%65.5%)	134(65.4%)	
Age				<0.001
≤ 65	48(36.4%)	17(58.6%)	121(59.0%)	
>65	84(63.6%)	12(41.4%)	84(41.0%)	

retrospectively evaluated the patients 18 years and older, whose histopathologically diagnosed as pancreatic ductal adenocarcinoma between January 2014 and December 2018. The local ethical committee approved the study protocol (Date: 06.11.2018, Approval number: GO 18/1049-36). Patients with incomplete data and unknown blood groups were excluded. Clinical and demographic data of patients were reviewed from the hospital records. (age, gender, blood group, stage). We evaluated the patients under three groups: early-stage, locally advanced stage, and metastatic stage and analyzed the prognostic significance of blood groups for each group. Statistical analyses performed via SPSS 20 (SPSS, Chicago, IL). Qualitative variables were expressed as frequencies and percentages, while quantitative as median (range). A chi-square and fisher exact test was used for the comparison of categorical variables. OS was defined as the duration between the diagnosis and the patient's death from any cause. The Kaplan-Meier log-rank test was used in order to define AB0 blood groups' impact of on OS. P<0.05 were assumed as statistically significant.

Results

We evaluated 366 pancreatic cancer patients (37% female, 63% male) with a median age of 65 years (range: 27-83). Table 1 summarizes the patients' other baseline characteristics.

The median overall survival (OS) was 11.0 months (95% CI, 9.49-12.50 months). Median survival based on blood groups were as follows: 13.0 months for blood group A (95% Cl, 10.59-15.41 months), 11.0 months for blood group B (95% Cl, 8.80-13.19 months), 12 months for blood group AB (95% CI, 6.63-17.36 months), and eight months for blood group 0 (95% Cl, 5.43-10.56 months, p = 0.171). 304 (83.3%) patients died during the follow-up. Figure-1 indicates OS curves stratified by blood groups in PDAC patients.

We found a shorter OS for metastatic pancreas cancer patients with blood group 0 considering the relationship between the stages of the disease and blood groups. Median survival for metastatic pancreas cancer was 8 months (95% 6.38-9.61). OS was shorter for patients that have blood group 0 compared to the other groups. Median OS was 5 months (95%, 3.12-6.87-months) for patients that have blood group 0, while it was 9 months (95% 6.95-11.04 months) in patients with other blood groups (P <0.001). Median survival in patients with metastatic pancreas cancer was found as 9.0, 11.0, 8.0, and 5.0 (95% CI, 6.38-11.6, 7.54-14.45, 3.84-12.15, 3.12-6.87) months respectively for blood groups A, B, AB, and 0 (Figure-2).

Discussion

Pancreatic cancer accounts for 6% of cancer-related death (15, 16). Most cases of pancreatic cancer are sporadic. Etiology is unclear in 40% of the cases, while the rest is associated with smoking, diet, and heredity (17). The factors involved in most of the patients are still unknown.

The role that blood groups play in the prognosis of pancreas cancer is still uncertain. Many researchers have investigated the relationship of the blood groups and pancreas cancer. A prospective cohort research in the United States on 107,500 American medical staff have shown that A, B, and AB groups increased the risk of

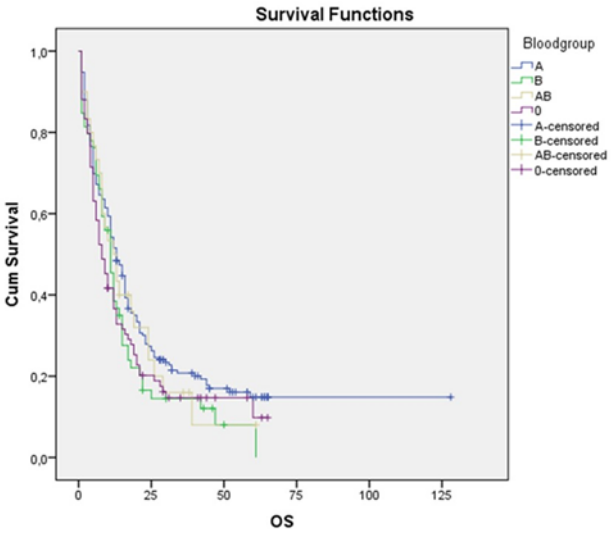


Fig.1. OS in PDAC patients stratified by AB0 blood groups

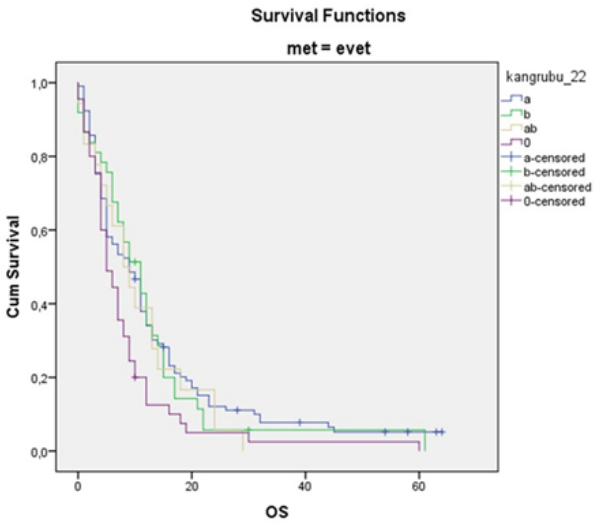


Fig.2. OS in metastatic PDAC patients stratified by AB0 blood groups

pancreatic cancer (18). In their research conducted with 417 patients, Dandona et al. confirmed that blood groups other than 0 increased the risk of pancreas cancer (19). Huang et al. concluded that blood groups AB and 0 reduced the risk of pancreas cancer as opposed to blood group A (20).

There are also studies investigating the effect of blood groups on overall survival in pancreatic cancer. In their study with 627 patients with resected pancreatic cancer, Rahbari et al. showed that patients with blood group 0 had a lower rate of pancreatic cancer and a better prognosis (21). A study in China concluded that the survival of early-stage pancreatic cancer patients with blood group 0 was higher (22). Similarly, the study by Engin et al. showed that OS was longer (13.8 vs. 8.8 months, p 0.04) for patients with 0 blood groups (23).

In this research, a statistically significant difference has not been found between blood groups and PDAC patients. Blood groups did not appear to pose a risk for pancreas cancer. Another significant result of our study was that we observed a shorter OS in the metastatic stage of the disease for the patients which have blood group 0. It was statistically significant. Other research suggest that in resected pancreatic cancer patients that have blood group 0 have more prolonged survival or blood group doesn't affect pancreatic cancer prognosis (24). In the literature, we did not find any data showing the relation of prognosis with blood groups in metastatic pancreatic cancer.

Retrospective design of the study created some limitations. We did not have enough data regarding the patients and disease characteristics. Our patient numbers were limited, and the number of centers participating in the study was low. Treatments could not be evaluated in detail. The number of early-stage pancreatic cancer patients is typically low since the symptoms emerge in the advanced stages of the disease. However, we found that the rate of early-stage pancreatic cancer is high among our patient group. It is a result of the preoperative checks on the blood groups.

Analysis of 366 patients with different AB0 blood groups indicated that the blood groups did not play a role in OS. However, they may have an impact on metastatic pancreas cancer, since we found that OS was shorter for the patients that have blood group 0, as a result of subgroup analysis based on stages.

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