

## RESEARCH ARTICLE

# Is There an Association between Blood Group and Survival in Pancreatic Cancer?

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### Abstract

**Background:** An association between the ABO groups and pancreatic cancer has been shown previously, group A being significantly commoner in affected patients. We conducted the present study to investigate the prognostic effect of ABO blood group on overall survival of pancreas cancer patients. **Methods:** Patients who were diagnosed between 2005 and 2010 with pancreas cancer at Ankara Numune Education and Research Hospital were analyzed retrospectively. Patient demographics and ABO blood groups were obtained from medical charts. **Results:** Fifty pancreas cancer patients with known ABO blood group were included, 26 (52%) group A, 12 patients (24%) group O, 9 (18%) group B, and 3 (6%) group AB. Blood group A pancreas cancer patient median age was 61.5 (39-80) years, with the median age of the other blood groups (B, AB, O) being 55.5 (32-74) years ( $p=0.14$ ). 18% of patients with blood group A and 11% of the other blood group patients had metastasis ( $p=0.17$ ) at the time of diagnosis. The median overall survival of blood group A pancreas patients was significantly lower than the other blood group patients, 7.6 (95% CI: 5.0-10.2) months versus 29.0 (95% CI: 0.0-68.8) months ( $p=0.05$ ). **Conclusions:** According to previously published cohort studies a relation may exist between ABO blood groups and cancer of pancreas. In this study we observed that pancreas cancer patients with blood group A have significantly worse overall survival than other blood groups.

**Keywords:** Blood groups- pancreas cancer - survival - Turkey

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### Introduction

Pancreatic cancer has bad prognosis and it is in the fourth most common cause of the cancer associated death causes (Jemal et al., 2009). Smoking, chronic pancreatitis, diabetes mellitus and obesity are among well-known risk factors (Lowenfels et al., 2006). Previous research studies demonstrated a link between the blood types and some cancer forms. (Halvorsen et al., 1986; Slater et al., 1993). Epidemiologic studies showed that ABO blood types are potentially related to the increase in the pancreatic cancer risk. The pancreatic cancer prevalence was found significantly higher in the individuals with ABO blood types ( $p=0.004$ ) (Greer et al., 2010). It was reported that the individuals with non-O blood types (A, B, AB) had 1.44% increased risk for pancreatic cancer (95% CI=1.44-1.82) compared to those of O blood type in a cohort study where a large population is studied (Wolpin et al., 2009).

The genotypic changes of the blood type cause abnormal glycosylation (Hakomori et al., 1989). The modifications of glycosyltransferase can also occur during tumorigenesis (Hakomori et al., 1999). Close association between ABO locus and pancreas cancer on

the chromosome 9q34 was found in a genomic study (Amundadottir et al., 2009). However, the association between the prognosis of pancreas cancer and the blood types, which is considered as a risk factor for the development of pancreas cancer, is not clear. We evaluated the link of various blood types with the general survival rate in patients with pancreatic cancer.

### Materials and Methods

The records such as clinical and pathological features, treatments, follow-up data and blood groups of pancreatic cancer patients who were treated at Ankara Numune Research and Educational Hospital, Medical Oncology Department between 2005-2010 were retrospectively examined. The patients' current condition was found out by phone conversation.

### Statistics

Fisher and chi-square test were used for nominal variables; the age, one of the numerical data, was assessed with Student-t test and other numerical data were analyzed with Mann-Whitney U test. The general survival time was

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considered as the duration from the diagnosis of pancreatic cancer until the death, or the last time that the patient was contacted. The general survival analysis was calculated with Kaplan-Meier method. Cox regression test was used for multiple variable analyses. The data were evaluated using computer based statistics package program (SPSS version 13.0) and a P value less than 0.05 was considered as statistically significant.

## Results

Fifty patients whose blood group has been documented were included in the study. The blood groups of the patients' were as follows: 26 (52%) type A, 9 (18%) type B, 3 (6%) type AB, 12 (24%) type O. The median age of the patients with type was 61.5 (the range was 39-80) years; the median age of the rest of 24 patients with other blood groups (B, AB and O) was 55.5 (the range was 32-74) years. There was no statistically significant difference between the two groups based on the age (p=0.14). Metastasis was present at the time of diagnosis in 18% of the patients with type A blood group, and in 115 of the patients with other blood groups. No statistically significant difference was found between these groups (type A blood group and type non-A blood group) (p=0.17). The general features of the patients' were shown in Table 1. The median general survival time was calculated as 7.6 months (95%CI: 5.0-10.2) in type

A blood group, and as 29.0 months (95%CI: 0.0-68.8) in the other blood groups. There was a statistically significant difference between the two groups based on the general survival (p=0.05) (Figure 1).

## Discussion

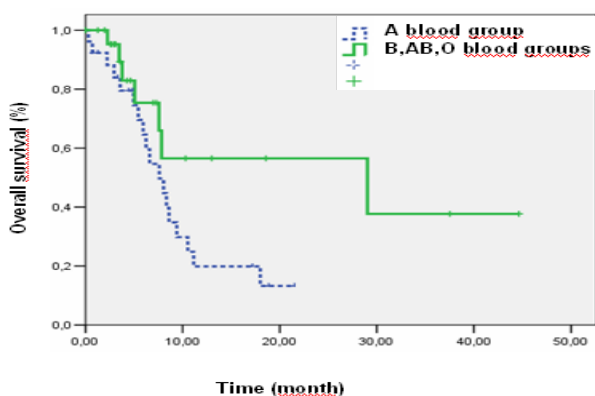
Various risk factors based on the blood groups have been demonstrated in the patients with pancreatic cancer in population screenings (Wolpin et al., 2009; Greer et al., 2010; Iodice et al., 2010). In our study, type A was the most common (52%) blood group. The studies in the literature mostly assessed the rise in the risk of blood groups based on the population; thus, there are yet no adequate data on sub-analysis of blood groups in the prognosis of pancreatic cancer patients. Largest study in this area was performed by Ben et al. (2011) in the Khan China ethnic group. Type O blood group and the other groups were compared in this study (A, B, AB). The median survival in types A, B, AB and O were 9.0, 9.0, 9.1 and 11.1 months respectively and no statistically significant differences were found between the groups (p=0.87). Likewise, there were no significant differences based on general survival time between type O and non-O (p=0.66). However, when subgroup analysis was performed in patients who underwent curative surgery, the median survival time was found as 16 months in type O and 11 months in the other blood groups (p=0.001). This finding demonstrates that the surgical method is more important than the patients' blood groups in the prognosis. Indeed, it is the fact that the survival in the patients who underwent surgical resection is significantly longer compared to those of the patients who did not have resection (Conlon et al., 1996). Similarly, no statistically significant difference was found between the survival rate and the blood groups in the two studies from China. In the study of Dandona et al. (2010) one of these two studies, when the non-O blood groups were compared to type O based on the survival rate, the risk ratio was calculated as 0.80 (95%CI=0.61-1.06) in type A, as 0.92 (95%CI=0.65-1.32) in type B, as 1.29 (95%CI=0.76-2.21) in type AB (Dandona et al., 2010). In the other study, when the non-O blood group and type O were compared, the risk was reported as 1.15 (0.93-1.42) (p=0.19) (Wang et al., 2012).

The general survival ratios in A, B, AB and O groups were 7.0, 7.0, 10.0 and 9.0 months respectively in the study of Engin et al. (2012) from Turkey. The comparison of non-O blood groups to type O revealed that the survival ratio was longer in the type O patients with pancreatic cancer (p=0.04). To the best of our knowledge, there are no studies assessing the effect of blood types on the general survival rate in the literature, except these mentioned studies.

We concluded that type A blood group, which was frequent in the patients with pancreatic cancer, was a bad prognostic predictor. Small patient group was an important limitation of our study. Inconsistent findings in the studies from various regions led to the thought that the ethnicity might have a role on the prognosis. Thus, studies with larger sample size are required to understand the potential effect of the blood groups on the prognosis

**Table 1. The General Characteristics of the Patients**

	A Blood Group (n=26)	Non-A Blood Group (n=24)	p
<b>Age (years)</b>			
Mean (range)	61.5 (39-80)	55.5 (32-74)	0.14
<b>Gender</b>			
Female (%)	5 (19.2)	15 (62.5)	0.21
Male (%)	21 (80.8)	9 (37.5)	
<b>ECOG Performance Status</b>			
0-1 (%)	18 (69.2)	17 (70.8)	1.00
2 (%)	8 (30.8)	7 (29.2)	
<b>Stage at diagnosis</b>			
Local-advance (%)	8 (30.8)	13 (54.2)	0.17
Metastatic (%)	18 (69.2)	11 (45.8)	
<b>Surgery (palliative/curative)</b>			
Yes (%)	11 (42.3)	10 (41.7)	1.00
No (%)	15 (57.7)	14 (58.3)	



**Figure 1. Kaplan- Meier Curve Showing Overall Survival According to Blood Groups**

of pancreatic cancer.

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