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The Association between Occupational Relevance and Survival in Acute Myeloid Leukemia

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INTRODUCTION

Occupational exposure to hazardous substances has a prognostic impact on the survival of acute myeloid leukemia (AML) patients, highlighting the need for further research in this area.

AIM

To investigate the impact of occupational exposure to hazardous substances on the disease characteristics and survival in acute myeloid leukemia patients

METHOD

DESIGN: A retrospective cohort study including AML patients from June 2018 to December 2020.

PATIENTS : Newly diagnosed AML patients aged 19 years and older

INTERVENTIONS: A trained investigator carries out an exposure assessment by employing a structured questionnaire and interviews to gather information on occupational substances exposure.

MAIN OUTCOMES MEASURES: The primary endpoint was the overall survival after the initiation of treatment.

RESULTS

The total 318 patients were included. For each case and control, the occupational information was estimated based on structured questionnaires covering 27 specific occupations and 32 exposure agents, which are based on International Agency for Research on Cancer (IARC) monograph for myeloid leukemia.

Cumulative exposure grade for agents, especially formaldehyde, adhesives, thinner, radiation was estimated through the evaluation of three items: exposure time, exposure level, and exposure intensity.

Based on the exposure time, exposure level, and exposure intensity of hazardous substances and occupational history, there were 43 patients (13.5%) who had occupational history and significant exposure to hazardous substances.

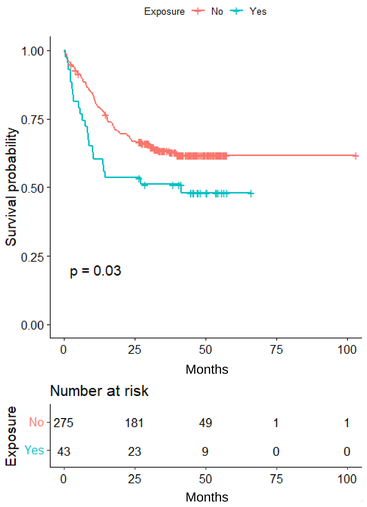
Between the non-exposure and the exposure group, there were no significant differences in the baseline characteristics (Table 1).

Despite the similarities between these two groups, there was a significant difference in survival between the two groups. The survival of patients with substance exposure was found to be significantly lower compared to the non-exposure group (Figure 1).

Table 1. Characteristics of patients

Exposure (median, IQR) or (N, %)	None (275)	Yes (43)	P
Age, age	53 (38-63)	53 (44-65)	0.29
Ejection fraction, %	63 (61.4-65.5)	64 (62.2-66.5)	0.21
FEV1, %	85 (75-94)	92 (77.5-99.5)	0.04**
DLCO, %	93 (82-105)	86 (80-101.5)	0.18
BM cellularity, %	90 (60-100)	90 (62.5-100)	0.81
BM blasts, %	70.5 (41.8-90)	71 (48-86)	0.69
WBC, per uL	13210 (2900-48460)	13490 (3590-64250)	0.86
Hemoglobin, g/dL	8.9 (7.4-10.2)	9.6 (8.6-10.9)	0.06*
Platelets, per uL	59000 (33000-105000)	63000 (37000-105000)	0.54
Total bilirubin, mg/dL	0.6 (0.5-0.8)	0.6 (0.5-1)	0.29
Albumin, g/dL	4 (3.6-4.4)	4 (3.6-4.4)	0.92
Creatinine, mg/dL	0.8 (0.6-1)	0.9 (0.7-1)	0.12
LDH, U/L	865 (495.5-1692.5)	870 (504-1957)	0.95
Ferritin, ng/mL	601 (302-1023)	1033 (429.5-1506.5)	0.09*
PT (INR)	1.2 (1.1-1.3)	1.2 (1.1-1.3)	0.13
aPTT, sec	27.4 (25.5-30.2)	27.6 (25.8-31.2)	0.63
Cytogenetic abnormality			
t(8;21)	20 (7.3)	5 (11.6)	0.36
inv(16)	14 (5.1)	0 (0)	0.23
t(15:17)	16 (5.8)	4 (9.3)	0.33
t(9:11)	3 (1.1)	1 (2.3)	0.44
t(3:3)	2 (0.7)	0 (0)	1.0
Mutations			
NPM1	46 (16.7)	10 (23.3)	0.29
FLT3-ITD	61 (22.2)	8 (18.6)	0.69
Kit	26 (9.5)	3 (7)	0.78
TP53	12 (4.4)	2 (4.7)	1.0
ASXL1	11 (4)	4 (9.3)	0.13
DNMT3A	42 (15.3)	6 (14)	1.0
biallelic *CEBPA*	23 (8.4)	3 (7)	1.0
AML MR	51 (18.5)	8 (18.6)	1.0
Defined by differentiation			
M0	7 (2.5)	0 (0)	0.60
M1	23 (8.4)	4 (9.3)	0.77
M2	18 (6.5)	4 (9.3)	0.52
M4	13 (4.7)	0 (0)	0.23
M5	9 (3.3)	1 (2.3)	1.0
Myeloid sarcoma	1 (0.4)	0 (0)	1.0
Biphenotype	13 (4.7)	3 (7)	0.46

Figure 1. Survival of patients



CONCLUSIONS

In conclusion, AML patients with significant occupational exposure to hazardous chemicals had poor survival outcomes, despite having similar disease characteristics compared to patients without exposure. These findings highlight the need for investigation of hazardous substance exposure history in newly diagnosed AML patients as well as a further evaluation about the substance-exposure related AML.

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