Investigating the Effect of Industrial Narcotics (Glass and Crack) on the Course of Acute Myeloblastic Leukemia (AML) among patients referring to Islamic Azad University Hospitals

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ABSTRACT

Introduction: Leukemia is a cancer with onset from the bone marrow which rapidly metastasizes to the bloodstream resulting in death if left untreated for a few months. The present study intended to investigate the effect of industrial drug abuse on acute Myeloblastic leukemia (AML) amongst patients referring to the hospitals of Islamic Azad University within 2014-2015. Materials and Methodology: The present observational case-control study targeted 120 AML patients who were randomly selected from the hospitals affiliated with Islamic Azad University based on simple convenience (census) sampling method. Due to the finite number of statistical population, all the available patients were selected as the samples of the present study. Accordingly, the case group included 60 AML patients with a history of drug abuse and the control group included 60 AML patients without a history of drug abuse. Data were analyzed using SPSS, version 13 software with significance level of P= 0.05. Results: It has been found that %20 of the case group alongside %5 of the control group had a history of drug abuse, which was representative of a statistically significant difference among two groups (P=0.013). Conclusion: According to the results of the present study, it could be concluded that industrial drug abuse had a significant impact on the course of acute Myeloblastic leukemia.

Key Words: Industrial Drugs, AML, Leukemia.

INTRODUCTION

Acute myeloid leukemia viz. AML, is a type of blood cancer. It influences bone marrow cells or myelocytes through an acute process. In this bone marrow disease, the myeloblasts develops a high number of red blood cells or abnormal platelets. The bone marrow cells are not mature enough in acute leukemia. In other words, transgenic myeloid cells are the subtypes of white blood cells that disrupt cell proliferation, hematopoiesis and normal immune system in the body. This type of cancer has several subspecies with a mean age of 64 years. Tobacco and narcotics abuse have nowadays become a serious

problem in the society. Despite various healthcare warnings and legal incidents, numerous adolescents have been endangering their lives with drug abuse. In addition to traditional drugs, the advent of various drugs under industrial names has developed various forms of drug addiction and drug-induced abnormalities in the recent years. Over the past decade, such narcotic substances branded as ''Glass[1]'', ''Crack'', ''Psychoactive Pills'' etc. have been found in the black market of Iran which not only have imposed negative psychosocial impacts but only have increased the risk of cancer in the country. These substances and drugs adversely affect the important parts of the brain and body cells to work inefficiently. It leads to tumorigenesis by disrupting the function of various body organs.

Crack heroin or simply compressed heroin is a narcotic substance shaped as heroin-bearing crystalline that is widespread in the Southwestern Asia. This type of narcotic drug is indeed derived from the combination of heroin with various impurities that has several side effects including extensive infections caused by bacterial activity in different tissues of a living organism.

Methyl Amphetamine is another narcotic, widely used in societies. It is branded as ''glass'' in the black market and is the name of a psychoactive substance. It is a nerve stimulant. Methamphetamine results in excessive happiness and excitement by acting directly upon the brain mechanisms. It can also cause severe sleep disorder or extreme insomnia. Glass abusers may be obsessed with serious anorexia during which they lose their appetite for hours or even days. In the meantime, this substance causes thirst provoking the sufferer to drink plenty of water.

Due to their hazardous chemical compounds e.g. benzene, such novel industrial narcotic substances are even more dangerous and lethal than traditional narcotics. Like any other types of cancer, leukemia is caused by the collapse of cell division order as a predisposing factor. Other factors affecting leukemia in adults include the exposure to ionizing radiation and certain specific chemicals, impairment of body's natural immune system and age. Drug abusers are more susceptible to acute and chronic diseases and complications. Blood disorders such as AIDS and hepatitis are known as the most common causes of death amongst abusers. Regarding narco-induced diseases and health risk, such ailments as cardiac arrest, arterial damages, irregular heartbeats, heart attack along with long-term use of narcotic drugs like heroin and steroids can result in irreversible hepatic injuries. The presence of toxic compounds, including benzene, in the composition of many industrial drugs, namely Glass, is considered as a carcinogenic agent whose detrimental impacts on AML cannot be easily overlooked. Abundant risk factors have been identified for AML, some of which are leukemia-like blood disorders, chemical exposures, ionizing radiations and genetics. Surveys and questionnaire studies are nowadays accounted as the most typical valuable studies. The application of such studies in assessing the knowledge, attitude and practice of diverse scientific fields has marked their efficacy, as an influential tool, in the field of either human sciences or medical sciences. These studies are mostly applied to the areas of medical sciences such as psychology and applied behavior analysis especially the measurement of one's quality of performance and satisfaction with healthcare service providing systems as well as the evaluation of the quality of life. Consequently, the present study investigated the effect of industrial narcotics on the treatment of AML patients.

MATERIALS AND METHODOLOGY

The present observational case-control study targeted 120 AML patients who were randomly selected from the hospitals affiliated with Islamic Azad University based on simple convenience (census) sampling method. Due to the finite number of statistical population, all the available patients were selected as the target subjects of the present study. Accordingly, they were assigned to a group of 60 AML patients with a history of drug abuse (case group) and a group of 60 AML patients without a history of drug abuse (control group). Data analysis was performed in SPSS, version 13, software. Measures of central tendency i.e. mean and standard deviation were used for assessing the quantitative variables while relative and absolute frequency distributions were used for the qualitative variable. The statistical tests used in the present study included Chi-square, Fisher and independent t-test. Finally, the probability value was estimated at 0.05 confidence level (P=0.05).

RESULTS

Table 1: Frequency distribution of subjects' age in the intended case and control groups

Group		Mean	Std. Deviation
Age	Case	30.2.	5.825
	Control	30.12	5.799

As shown in Table (1), the frequency distribution of subjects' age was homogeneous in both groups (P>0.05).

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[1] AKA Crystal and Ice

Table 2: Frequency distribution of subjects' sex in the intended case and control groups

		Gender		Total
		Male	Female	
Group	Case	36 60.0%	24 40.0%	60 100.0%
	Control	33 55.0%	27 45.0%	60 100.0%
Total		69 575%	51 42.5%	120 100.0%

According to Table (2), the frequency distribution of subjects' sex was homogeneous in both groups (P>0.05).

Table 3: Frequency distribution of drug abuse in the intended case and control groups

		Substance Use		Total
		POS	Neg	
Group	Case	12 20.0%	48 80.0%	60 100.0%
	Control	3 5.0%	57 95.0%	60 100.0%
Total		15 12.5%	105 87.5%	120 100.0%

It has been displayed in Table (3) that %20 of the case group alongside %5 of the control group had a history of drug abuse, which was representative of a statistically significant difference (P=0.013).

Table 4: Frequency distribution of drug abuse duration and AML duration in the intended case and control subjects

	Substance Jse Duration	AML DurATION
Mean	4.53	10.17
Std. Error of Mean	.624	.547
Median	5.00	10.00
Std. Deviation	2.416	4.239
Variance	5.838	17.972

The mean value of substance use duration was 4.5±2.4 years, while AML duration equated 10.2±4.2 years.
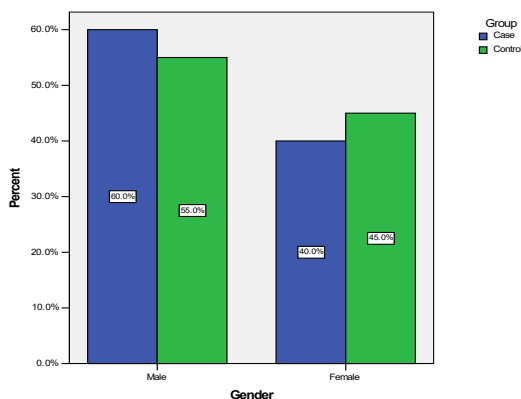

Fig. 1: Frequency distribution of subjects' sex in both case and control groups

According to Figure (1), the frequency distribution of subjects based on their gender, was homogeneous in both groups (P>0.05).
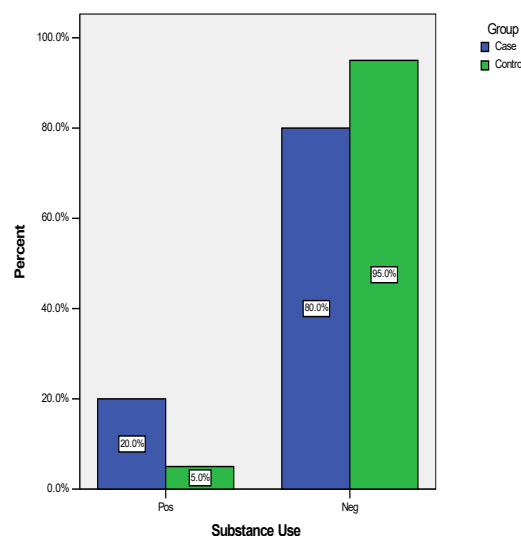

Fig. 2: Frequency distribution of drug abuse in the intended case and control groups

As illustrated in Fig. (2), %20 of the case group alongside %5 of the control group had a history of drug abuse, which was representative of a statistically significant difference (P=0.013).

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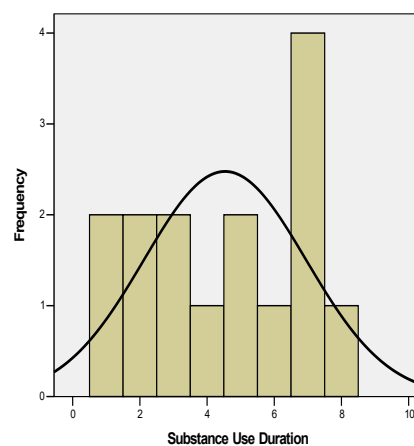
Fig. 3: Frequency distribution of drug abuse duration in the intended subjects

The mean value of substance use duration was 4.5±2.4 years

Fig. 4: Frequency distribution of AML duration in the intended subjects

The mean value of MAL duration was 10.2±4.2 years

DISCUSSION

The present study aimed at investigating the effect of industrial narcotics on the course of acute Myeloblastic leukemia. The results indicated that %20 of the case group alongside %5 of the control group had a history of drug abuse, which was representative of a statistically significant difference (P=0.013).
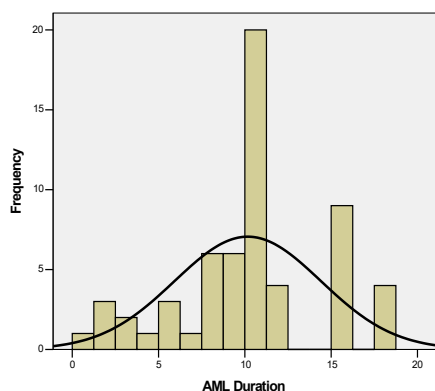
Methamphetamine use had failed to deliver the dopamine transfers (as a dopamine nerve terminal marker). It is associated with reduced brain function, memory loss, low concentration and such cognitive functions as inhibitory control. Beside, methamphetamine increased cytoplasmic concentration of dopamine, which boosted oxidation process that is toxic for nerve terminals [1, 2].

Vahedi et al. (2011) investigated the frequency of AML indices based on Flow Cytometry in Imam Khomeini Hospital, Urmia, Iran within a year. They found that 61 subjects had acute leukemia, 22 had chronic lymphoproliferative disorders and 36 were miscellaneous amongst the intended subjects. About 27 out of 61 cases of acute leukemia had AML. Measuring the frequency of AML markers based on Flow Cytometry can be an appropriate method to evaluate these markers [2].

Abbasi et al. (2013) studied the relationship between FLT3 mutations and complete recovery of AML patients in Shariati Hospital. To this end, they extracted DNA form the blood and bone marrow samples of 100 AML patients in order to determine the prevalence of the aforesaid mutations and investigate their relationship with prompt AML prognosis based on PCR method. They found that although the effect of ITD-FLT3 and D835 mutations on the overall survival rate of patients was not statistically significant, the mutation of ITD-FL3 could be

considered as a vital factor in the selection of a proper treatment to increase the chance of full recovery in patients [3].

Schultz et al. conducted a YRBS survey on 117 AML patients with under-five disease prognosis. They found that tobacco, alcohol and marijuana were the most commonly used drugs. About %22 of subjects had been smoking cigarette within the past 30 days, %25 had been drinking alcohol within the past month, while less than %10 were reported to use cocaine, heroin and methamphetamine. Male subjects were more exposed to the abovementioned substances (P=0.004) [4].

Regarding the relationship between AML and polymorphisms of C609T and C465T in NQO1 gene, Safaei et al. (2011) indicated that there was not a statistically significant relationship between the risk of acute myeloid leukemia and the polymorphisms (C609T & C465T in NQO1 gene); Moreover, the variants of C609T, C465T and NQO1 were not considered as a significant factor affecting acute myeloid leukemia [5].

In a recent study on the non-psychotic effects of cannabinoid and cannabidiol on stimulating apoptosis in leukemic cells, Robert et al. showed that exposure of leukemic cells to cannabinoid receptor 2 (CB2) through cannabidiol led to reduced cell mediation and apoptosis induction. Besides, treatment with cannabidiol exhibited a significant decrease in tumor pressure and showed an increase in apoptotic tumors in the body. It is worth noting that exposure to cannabidiol resulted in a significant upsurge in the active oxygen species and overexpression of NAD (P)H oxidase, Nox4 and P22^{Phox} [6].

Kast and Focosi studied the use of antidepressants and old monoamine oxidase inhibitors for Parkinson treatment as well as the use of methamphetamine for chronic myeloid leukemia (CML) if colon was situated in the central nervous system, both as unplanned drugs to cross the blood-brain barrier (BBB). They found that these substances were capable of passing through the blood-brain barrier in rodents. Moreover, methamphetamine may play a crucial role in the treatment of both CML and glioblastoma because it leads to higher concertation of Imatinib behind the BBB. Therefore, it was a simpler way to cross the BBB and to allow chemotherapy to act more efficiently with tyrosine kinase [7].

Shultz et al. investigated the health-risk behaviors of survivors with a history of AML in their childhood according to report by Children's Oncology Department. They found that exposure to narcotic substances was associated with risk behaviors like using tobacco, alcohol and marijuana as the most common substances. Furthermore, they showed that there was not a significant difference between the adolescent drug abusers and

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adolescent drug non-abusers in their exposure to tobacco, alcohol and marijuana [4].

CONCLUSION

Consistent with the findings of preceding studies, the results of the present study indicated that industrial drug abuse had a significant effect on the course of AML amongst leukemic patients. In finale, however, prospective researchers have been recommended to conduct further studies on a larger sample size to investigate the factors affecting industrial drug abuse in AML patients in multiple centers so as to confirm the observed findings of the current study.

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