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A Study on Haematological Parameters in Chronic Opium Abusers in Western Rajasthan

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Abstract: Over the centuries, opium has been the most frequent substance abused in the many parts of the world. In India opium dependence is widely prevalent in certain states of India, especially Rajasthan, Punjab, Haryana, Madhya Pradesh etc. In rural areas of western Rajasthan crude opium is consumed with a social acceptance by adult male population. Later on they become addicted to it. There are many studies about the effects of opium on the various body systems but its chronic abuse effect on autonomic functions is still unclear, therefore this study is undertaken to explore the effect of chronic abuse of opium on Haematological parameters in opium dependent subjects of western Rajasthan and its comparison with normal non - addicted controlled subjects. In this study total 100 male subjects were included, which were further divided in two groups. 50 subjects were from opium addicted population and 50 were healthy subjects. Female subjects were omitted from analysis due to their low numbers. Subjects who fulfilled DSM- IV criteria were chosen as opium dependent subjects. All the haematological parameters were assessed to show the effect of opium addiction on blood cell count, haematocrit, blood indices and ESR. In our present study, we found that in opium addicted subjects, Red blood cell counts, haematocrit and haemoglobin level decrease was highly significant ($P < 0.001$). The MCV, MCH has highly significant change while in MCHC there was no statistical difference in between two groups. White blood cell count however increased significantly in opium addicts with significant increase in differential neutrophils and monocyte count and significant decrease in Differential lymphocytes count ($P<0.05$) . Differential count for eosinophil and basophil showed no significant change ($P>0.05$. The erythrocytes sedimentation rate decrease was not statistically significant ($P>0.05$).). The observations in our led to the conclusion that improper feeding, lack of self-care, inadequate diet and low level of haemoglobin would cause anaemia and decrease immunity in opium addicted group which results in various infections. So recognition, treatment, and prevention of this change could be a new step in improving of health and condition of patients.

Keywords: Opium abuse, Haematocrit, Blood indices (MCV, MCHC, MCH), Differential count and ESR (Erythrocyte Sedimentation Rate) etc.

INTRODUCTION

Opium abuse is a major health problem in developing countries including our country. Despite legal restriction and administrative control, the use of illicit drugs (like opium, heroin etc.) has increased considerably in many parts of North India More than 180 million people around the world have tried illegal drugs at least once, of whom 13.5 million are opium dependent [1].

Opium, in contrast to pure opioid drugs, is a complex and variable mixture of substances. There are however, more than 20 alkaloids [2] and more than 70 components [3] in opium, thus its effect on metabolism and the endocrine system could therefore be different from pure morphine, noscapine and papaverine. Opium is used as the raw material for the synthesis of some medications such as morphine, noscapine and papaverine (10%, 6% and 1%of opium respectively) [4, 5]. It is reported that between 1 and 30 g of opium may be used by an addict, either orally or inhaled. The

effects of opium are essentially those of morphine. The major effects of opium are on the central and autonomic nervous system and the bowels; while it also influences other organ systems including the respiratory and cardiovascular systems [1]. Several investigations about the effects of opioid peptides on the cardiovascular system have also been performed [6, 7].

Although there are many studies on various effects of opium in abusers in many parts world, on metabolism like glucose metabolism [8] lipid profile [9] and risk for cardiovascular system [10] and effects on various serum factors like sodium, potassium, calcium, iron, serum proteins and serum enzymes like ALT, AST [11], liver function [12] etc. But in India studies related to these effects of opium is very less. The work done is mostly related to its prevalence of abuse in different areas and in different communities [13].

However, we could not find any reports on the effects of chronic abuse of opium on Haematological parameters in India. In view of this, the present study is undertaken to show the effects opium addicted population.

MATERIALS AND METHODS

The present study was conducted in department of Physiology of Dr. S. N. Medical College, Jodhpur. Total 100 male subjects with age ranged from 25 to 45 years were selected from the different areas of Jodhpur region. Before inclusion into the study all ethical consideration for the subjects were taken in account. An informed written consent was obtained from each subject.

All the subjects were then divided into two groups

Group I: Control - consisted of 50 healthy subjects.

Group II: Opium addicted – 50 subjects (consuming opium about 5-11gm/day for > 2 years), visiting Psychiatric department of MDM Hospital, Jodhpur, for de-addiction and those who fulfil the DSM-IV criteria for opium addiction developed by the American Psychiatric Association (1994) were included in this study.

Exclusion criteria

Subjects who abused several drugs simultaneously & alcohol abusers, smoker, taking tobacco or any other substance, or having past history of any disease like hypertension, diabetes, dyslipidaemia, heart, kidney or liver diseases, blood related diseases or any special disease like AIDS, before the opium abuse started, were excluded from this study.

Subjects in both the groups (addicted and control) were subjected to following haematological parameters:-

Total Red Cell Count, Total Leucocytes Count, Total Platelets Count, Haemoglobin, Haematocrit, Blood Indices (MCV, MCH, and MCHC), Differential Leukocyte Count, And Absolute Leucocytes Count by Cell Counter and Erythrocytes Sedimentation Rate also.

Data were expressed as mean± SD standard deviation). For statistical analysis student t test was used.

RESULTS

Table 1, 2 and 3 shows characteristic changes in haematological parameters in control (50) and opium addict subjects (50). Data so obtained were expressed as mean ± SD and statistically analyzed by using the Microsoft Excel and Open Epi software (version 2.3.1). Students' (unpaired) was used to analyzed whether the result obtained are significant or not. P value of less than 0.05 will be accepted as significance difference b/w the compared values.

Table no. 1 shows blood cell count and ESR values. Total Red cells count was decrease while Total white blood cell was increase significantly in opium addicts subjects compared to that of control subjects.

Table-1: Total cell counts and ESR in control and opium addicted group

Parameter	Control Group	Opium Addicted Group	Students-t test	
			t- *value*	*p- value*
TRBC(Cells in millions/cumm)	5.77±0.44	5.12±0.53	11.557	< 0.0001***
TLC(Cells in thousands/cumm)	7.16±1.25	7.87 ±1.62	4.250	< 0.0001 ***
TPC (Cells in lacs/cumm)	2.29±0.66	2.28±0.68	0.1292	0.8973*
ESR (mm After 1st hour)	11.66±5.11	11.75±5.53	0.1464	0.8837*

Note -All values expressed as Mean ± SD; * *p* value > 0.05 (NS) ** *p* value < 0.05(S) *** *p* value < 0.01(HS)

Table-2: Differential leucocytes (DLC) and absolute leucocytes (ALC) in control and opium addicted group

Parameter		Control Group	Opium Addicted Group	Students-t test	
				t- *value*	*p- value*
TLC(Cells in thousands/cumm)		7.16±1.25	7.87 ±1.62	4.250	< 0.0001***
Neutrophils	DLC (%)	58.26±2.94	59.46±6.78	1.997	0.0472**
	ALC (cells in thousands/cumm)	4.17±0.74	4.69±1.14	4.686	< 0.0001***
Eosinophils	DLC (%)	2.76±0.74	2.97±1.45	1.580	0.1156 *
	ALC (cells in thousands/cumm)	0.20±0.06	0.23±0.13	2.566	0.0110**
Basophils	DLC (%)	0.61±0.37	0.59±0.46	0.4149	0.6785*
	ALC (cells in thousands/cumm)	0.04±0.03	0.04±0.03	0.000	> 0.9999*
Lymphocytes	DLC (%)	32.30±2.53	30.30±5.11	4.210	0.0001***
	ALC (cells in thousands/cumm)	2.31±0.46	2.38±0.65	1.077	0.2826*
Monocytes	DLC (%)	6.08±1.033	6.68±1.62	3.828	0.0002***
	ALC (cells in thousands/cumm)	0.44±0.12	0.52±0.17	4.709	< 0.0001***

Note -All values expressed as Mean ± SD; * *p* value > 0.05 (NS) ** *p* value < 0.05(S) *** *p* value < 0.01(HS)

Table No. 2 shows Differential leucocytes (DLC) and absolute leucocytes (ALC) in control and opium addicted group. Haematocrit and haemoglobin was also low in opium addicted population compared to that of control male subjects.

Table-3: Hematocrit, haemoglobin and blood indices in control and opium addicted group

Parameter	Control Group	Opium Addicted Group	Students-t test	
			t- *value*	*p- value*
Haematocrit value (%)	51.31±2.89	46.32±4.67	11.128	0.0001***
Haemoglobin (gm%)	14.68±4.67	14.18±1.35	3.754	0.0002***
MCV (fl)	89.55±8.165	92.61±8.60	3.160	0.0017 ***
MCH (pg)	27.09±2.584	28.00 ±2.61	3.037	0.0026 ***
MCHC (g/dl)	31.32± 2.35	30.86±3.66	1.295	0.1964*

Note -All values expressed as Mean ± SD; * *p* value > 0.05 (NS) ** *p* value < 0.05(S), *** *p* value < 0.01(HS).

DISCUSSION

In our present study, we found that in opium addicted subjects, red blood cell counts decrease was highly significant (P < 0.001) as shown in Table No. 1. Studies related to TRBC are not widely done so there are less data to compare our present study. Study done by Gholamreza Asadikaram, 2013, stated that in diabetic opium-addicted male group the mean counts of RBC significantly increased as compared with diabetic male group [14]. The Tahereh H, 2010 in his study indicated that in the period of opium dependence and its related withdrawal, red blood cell count remained unchanged both toward each other and in comparison with that in the control group [15].

White blood cell count however increased significantly in opium addicts statistically the results are highly significant (P< 0.0001). The total platelets count in opium group was 2.28±0.68 lacs/cumm (Mean±SD) while in control group was 2.29±0.66 (Mean±SD).

TPC were less in opium addicted group than control subjects and statistically the result is non-significant (P>0.05) as shown in Table No. 1. The outcome of this study was similar to the study done by Gholamreza Asadikaram, 2013 [14].

The erythrocytes sedimentation rate decrease was not statistically significant (P>0.05) as shown in Table No. 1. These observations led to the conclusion that improper feeding, lack of self-care, inadequate diet and low level of haemoglobin would cause anaemia and infection in opium addicted group.

White blood cell count however increased significantly in opium addicts with significant increase in differential neutrophils count (P<0.05) and highly significant increase in absolute neutrophil count (P<0.001). Differential count for eosinophil and basophil showed no significant change (P>0.05) while absolute eosinophil count rise is significant in opium addicts. Differential lymphocytes count decrease significantly while absolute value as showed in table no. 2 had no significant change while the differential and absolute monocyte count increases in opium addicts highly significantly.

Our results are in agreement with the study done by Tahereh H[15], in the year 2010 who observed that the white blood cell count and neutrophil count actually had a significant increase in comparison with that in control group (P<0.05) and neutrophil count increase was significant with P<0.001 while number of eosinophils showed no difference. The lymphocyte count had a significant reduction (P<0.001) and

monocyte counts were significantly increased in opium dependents ($P<0.05$ respectively). Morphine is the agonist of μ opioids receptors and the main and active metabolite of heroin. It was indicated that morphine and heroin in dose dependent way could reduce the proliferation of lymphocytes. Moreover, these inhibitory effects disappeared by naloxone. The possible mechanism of immune suppression by morphine might regulate the immune system either directly via mu opiate receptors located on the immune cells, or indirectly through a central pathway with the activity of the mu receptors in the central nervous system (CNS) [15].

The aim of the current study was to make awareness among opium addicts and in society about harmful effect of opium addiction and dependence on their blood and immunity of body because long time use of opium may causes decrease in haemoglobin and RBC which cause anaemia. With this they immunity is also affected results in more changes to infections to body. No data is available to compare our finding which we have got in our work and a wide scale study is recommended to confirm our findings.

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