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PLASMA CORTISOL LEVELS IN HEROIN ADDICTS

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Abstract: Opioids can affect neuroendocrine functions, with the consequence that various endocrine abnormalities, included the increased level of cortisol that can result from depression, may be acceptable in patients who use opioids. The pathophysiological mechanism that has been postulated does explain these findings, including the direct action of heroin along the hypothalamic-pituitary-adrenal axis. The **AIM** of this study is to examinations the correlation between duration of heroin addicts, plasma cortisol levels and depression in heroin addicts. **Materials and Methods:** The cross section present study included groups of n= 50 heroin addicts evaluation to the clinic for outpatients (ambulance) in medical institution- Psychiatric Hospital Skopje. All the patients followed criteria for opioid dependence. Criteria for elimination was: chronic liver or renal diseases, HIV diseases or active infection. The cortisol plasma levels were assayed using the chemiluminescent immunometric assay (CLIA) normal range of cortisol level was 55,0 – 690nmol/l. For in vitro diagnostic use with the Immulite 2000 Systems Analyzers –for the quantitative measurement of cortisol in serum, as an aid in the clinical assessment of adrenal status. To determinate exactly results of plasma cortisol levels we use QS of the Biorad. Depression was assays with Beck Depression Inventory (BDI) considerate with 21 items. The results were an analyzed statistically using; descriptive methods, t-test for independent simplex and the Pearson coefficient of linear correlation. The statistical test were considered significant at the level $p \leq 0{,}05$. **Results:** The group consisted of n=50 heroin addicts evaluation to the clinic for outpatients (ambulance) in medical institution- Psychiatric Hospital Skopje. A higher percentage 54 % of heroin addicts have normal plasma cortisol level and 46 % have a higher plasma cortisol level. In our study we got positive correlation between duration of heroin addiction and plasma cortisol level but without statistically significant $p > 0{,}05$. A high number of heroin addicts 62% had higher score of BDI≥10 only 38% had score of BDI<10 (table 6). Between cortisol plasma level and score BDI (depression) we got statistically significant correlation $p < 0{,}0001$. **Conclusion:** In some heroin addicts we got higher plasma cortisol level and higher percent of score BDI≥10. Correlation between plasma cortisol level and score of BDI was significantly. So one of the endocrine abnormalities in opiate users is a higher cortisol plasma level who can correlate with depression. Maybe treatment heroin addicts will be normalization levels of ACTH and cortisol.
Keywords: heroin addiction, cortisol plasma level, depression.

INTRODUCTION

In literature research (4,6) very little is known about heroin affected on endocrine hormones in opiate users. Some studies reported that various endocrine abnormalities have been reported in opiate users such as ; increased level of thyroxine (T4), triiodothyronine (T3), thyroxine binding globulin, insulin and glucose metabolism abnormalities similar to those seen type 2 diabetes, increased prolactin level, reduction in testosterone level, abnormalities in follicular stimulation hormone level, abnormalities in ACTH and cortisol secretion (1,2). The pathophysiological mechanism that has been postulated does explain these findings, including the direct action of heroin along the hypothalamic-pituitary-adrenal axis (4,5). Some studies have concluded that one of the endocrine abnormalities in opiate users is a higher cortisol plasma level (3,7). Another study suggested that opiates directly depress the hypothalamic pituitary axis, resulting in lower ACTH secretion and cortisol secretion(4,8). Some authors went on to describe a state of compensated primary hypoadrenalisam in these in heroin addicts whereby reduced secretion of cortisol through a lack of negative feed-back mechanism resulted in greeted plasma ACTH and cortisol (5,9). Previous studies have been shown that opiates can increased level of cortisol in heroin addicts in a way similar to what happens in depression (6,7).Some studies reported that after stabilization heroin addicts with adequate doses of substitution therapy these hormone levels have been to return to normal. Normalization of the function of the HPA axis, as reflected by normalization levels of ACTH and cortisol (8,9,10).

The AIM of this study is to examinations the correlation between duration of heroin addicts, plasma cortisol levels and depression in heroin addict.

MATERIALS AND METHODS

The cross section present study included groups of n=50 heroin addicts evaluation to the clinic for outpatients (ambulance) in medical institution- Psychiatric Hospital Skopje. After complete description on the study, a written informed consent was obtained confidentially of information was assured. The study protocol was approved by the local ethic commitment. All the patients followed criteria for opioid dependence. Criteria for elimination was: chronic liver or renal diseases, HIV diseases or active infection .All the patients there followed by routine medical examination, with included blood chemistry , urino analisis to determinate the heroin addicts and serology for hepatitis and HIV infection. Hormone assays: blood samples of heroin street addicts were obtained the morning between 9,00-11,00 hours in the University Clinic of Clinical biochemistry Skopje. The cortisol plasma levels were assayed using the chemiluminescent immunometric assay (CLIA) –high sensitive methods. For in vitro diagnostic use with the IMMULITE 2000 Systems Analyzers –for the quantitative measurement of cortisol in serum, as an aid in the clinical assessment of adrenal status. The normal range of cortisol level was 55,0-690nm/l. To determinate exactly results of plasma cortisol levels we use QS of the BIORAD . Depression was assays with Beck Depression Inventory (BDI) considerate with 21 items. The score DBI ≥10 determinate depressive symptoms. The results were an analyzed statistically using; descriptive methods, t-test for independent simplex and the Pearson coefficient of linear correlation The statistical test were considered significant at the level $p \leq 0,05$.

RESULTS

The group consisted of n=50 heroin addicts evaluation to the clinic for outpatients (ambulance) in medical institution- Psychiatric Hospital Skopje. In the examination group 45 was male and 5 was females, who had mean age of 27,2±16,7 years. With heroin duration average 8,84±6,42 years. The distribution of examination groups (heroin addicts)e included in the study by nationality, education level, marital and employed status shown in Table 1. Higher percent of them was Macedonian nationality, a lot of them was low level of education ,was unemployed and unmarried . So this results show that groups of heroin addicts have problems in communities existence.

Table 1. Distribution of examination groups (heroin addicts)e included in the study by nationality, education level, marital and employed status .

Examination group(heroin addicts)		
	N	%
Nationality		
Macedonians	30	60,00
Albanians	15	30,00
Serbs	2	4,00
Turks	2	4,00
Croats l	1	2,00
total	50	100,00
Married Marital status		
married	22	44,00
Unmarried	28	56,00
total	50	100,00
Education level (years)		
≥ 8	23	46,00
≥12	23	46,00
≥16	4	8,00
total	50	
Employment status		
employed	11	22,00
Unemployed	39	78,00
total	50	100,00

The heroin addicts in examination groups was with long duration of heroin abuse. The mean duration of heroin addicts in examination group was 8,84 years (table 2).

Table2. Duration of heroin addiction in years

years	mean±	Min	max	SD
Duration of Heroin addiction	8,84	1,0	12	±6,42

Distribution of the heroin addicts into examination group on the basis of the cortisol plasma levels show in table 3, 4. A higher percentage 54 ,00 of them have normal plasma cortisol level and 46,00 % have a higher plasma cortisol level. In our study we got positive correlation between duration of heroin addiction and plasma cortisol level but without statistically significant p>0,05.(Figure 1).

Table.3. Values of cortisol plasma levels in examination group

Cortisol levels nmol/l	N	mean	Min	max	SD
Examination group	50	586,78	130	944	±285,36

Table.4. Distribution the heroin addicts on the basis of higher or normal cortisol levels

Corisol level (nmol/l)	Examination groups (heroin addicts)	
	N	%
higher	23	46,00
normal	27	54,00
total	50	100,00

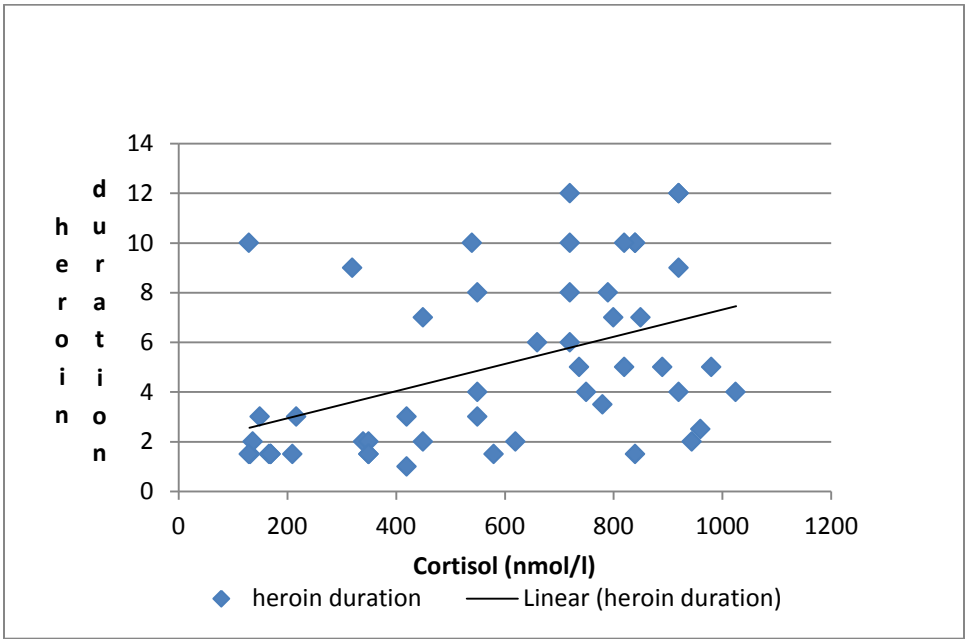


Figure.1. Correlation between duration of heroin addiction and cortisol plasma levels in examination group.

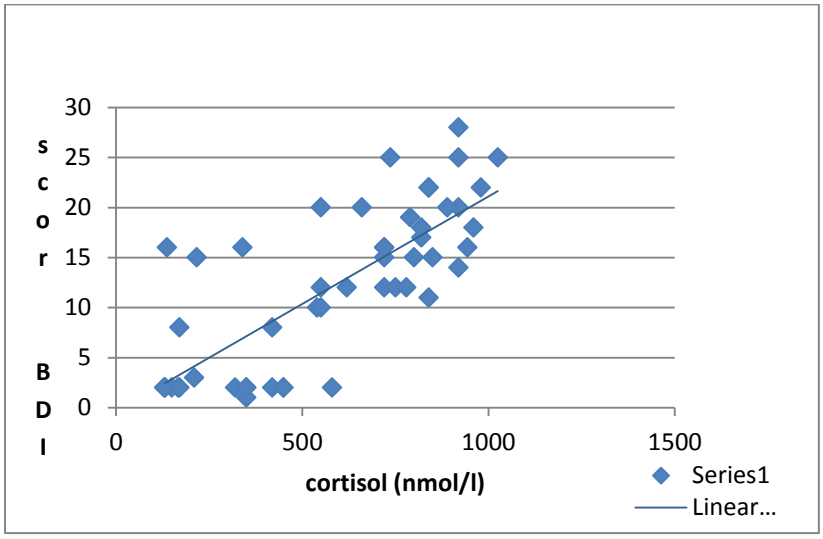
The mean value of the BDI score in examination groups show in table 5. A high number of heroin addicts 62% had higher score of BDI≥10 only 38% had score of BDI<10. (table 6). There is statistically significant correlation between cortisol plasma level and depression p<0,0001. Figure 2

Table 5 . Values of BDI score levels in examination group

BDI score	N	mean	min	max	SD
Examination group	50	12,24	1	28	±7,99

Table 6. Distribution of the heroin addicts according to BDI score

Scor BDI	N	%
Scor BDI≥10 (with depressive symptoms)	31	62,00
Scor BDI≤10 (without depressive symptoms)	19	38,00



Pearson coefficient p < 0,0001

Figure.2. Correlation between score of BDI (depression) and plasma cortisol levels in heroin addicts

DISCUSSION

In our study higher percent of heroin addicts were Macedonian nationality, a lot of them was low level of education ,was unemployed and unmarried . So this results show that groups of heroin addicts have problems in communities existence. This results correlate with results in another study (12,13). So treatment with substitution therapy tend to normalization social life in heroin addicts(13) . The heroin addicts in examination groups was with long duration of heroin abuse. The mean duration of heroin addicts in examination group was 8,84±6,42 years . Some studies reported that there are no abnormalities in ACTH or cortisol secretion in heroin addicts when the duration of use is short (1,12), that may explain why higher percent 62% of examination groups have score of BDI≥10 in our study. Another studies have demonstrated a fall in cortisol plasma concentration to low levels in heroin addicts (14,15,16), but in our study there were no subjects with low cortisol plasma levels . Some studies reported that in central heroin addicts heroin addiction increased cortisol plasma levels may persist a long time-a phenomenon that may be persist a co morbid disorders , such as depression (14,17)We also found that there is a correlation between cortisol plasma level and depression(as reflected in tne BDI scores) and this too. In our study we got positive correlation between duration of heroin addiction and plasma cortisol level but without statistically significant p>0,05, and we also got statistically significant correlation between cortisol plasma level and depression p<0,0001. These results also correlate with the results obtained in other studies indicating the direct effect of heroin to the development of depressive symptomatology(2,3). In other words, long-term heroin abuse leads to the development of depressive symptomatology(14). The opiates decrease the catecholamine while increasing the level of cortisol. (16). The results obtained do not correlate with results from past studies that have indicated that the opiates acting on the hypothalamic pituitary axis lead to a decrease in the secretion of

adrenocorticotropic hormone and thus to a decrease in cortisol secretion. (2,.15.16). Some study supported in the same observation with results indicating subnormal plasma concentrations of cortisol in the respondents, i.e. heroin addicts (11). Other studies indicate that there are no abnormalities in the function of the adrenocorticotropic hormone in heroin addicts, i.e. the addicts have normal plasma concentrations of cortisol both during heroin use and during abstinence. (16,17). Such a situation is most likely due to the activation of the feedback mechanism, as the authors themselves explain in their studies. During the period of heroin use, the levels of catecholamine and corticosteroid are within normal boundaries, i.e. they are not affected, and therefore there is no development of pronounced depressive symptomatology (12.9). However, we should also consider the fact that the development of sexual dysfunction (17) in this relatively young population may lead to difficulties in building intimate relationships with their partners, as well as feeling of uncertainty, loneliness, which may all lead to a development of depressive symptomatology.

CONSLUSION

In some heroin addicts we got higher plasma cortisol level and higher percent of score BDI≥10. Correlation between plasma cortisol level and score of BDI was significantly. So one of the endocrine abnormalities in opiate users is a higher cortisol plasma level who can correlate with depression . Maybe treatment heroin addicts with adequate doses of substitution therapy hormone levels have been return to normal. Normalization of the function of the HPA axis, as reflected by normalization levels of ACTH and cortisol

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