Some immunological parameters in abuse substance addicted

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Abstract. Drugs are chemicals which cause either physical or mental changes in body functioning. These chemicals may be natural, such as cocaine, semi-synthetic, such as heroin and ecstasy, or totally synthetic, such as methadone. The study was occurred between February and August of 2018 on drug users in Najaf government. 50 of whom were abusers, twenty as healthy control group at age 17-25 years. Multi drug rapid test was use to qualitative test for abuse substances. The results appeared a high percentage of alcohol abusers (18%), other types 16% synthetic Marijuana (K2), Benzodiazapines – alcohol 13%, Amphetamine (AMP) 12%, AMP + Methyleni oxymeth amphotamine (MDMA) + K was11%, (AMP + BZO + Marijuana THC), 9% K2 + AMP (7% K2 + BZO + THC), respectively. Some immunological parameters was studied. The results found IgG concentration was significantly higher at 912.49 compare with control 882.74, as well as alcohol 11475.35, BZO + alcohol 925.33, AMP + MDMA + K (1480,83), AMP + BZO + THC (1616.6), showed a higher concentration of control, but some abusers had a lower concentration than control, (332.53) Amp, K2, (576. 66) THC, (476. 66) K2 + BZO + THC 690.766 pg/ml. IgM concentration was high 177.27 in addicted compare with control 61.3, and high in all drugs. Results showed that Interleukin 10 concentration was 104.04 pg/ml found a high contrast with control 39.19 and all abusers had concentrations higher than control.

Key word, drug abuse, immune system, interleukin

1. Introduction

Psychoneuroimmunology is a specialized field of research that studies relationship among the nervous and immune systems, the behavior and health. Psychoneuroimmunology researchers deals with number of disciplines including, psychology, psychiatry, neuroscience, immunology, infectious diseases, endocrinology, and behavioral medicine. Substances of abuse with stimulant properties, such as cocaine, amphetamine, and methamphetamine, are among the more commonly abused drugs. These drugs are associated with well-characterized changes in the levels of catecholamines (e.g., dopamine, epinephrine, norepinephrine) that have both central and peripheral effects on neurotransmission and neuroendocrine signaling. Given their activating effects on the sympathetic nervous system, abused stimulants are potential mediators of the immune system effects of stress Loftis, 2013.
About 76.4 million people worldwide meet criteria for alcohol use disorders, and 15.3 million meet criteria for drug use disorders. Given the high rates of addiction and the associated health, economic, and social costs, it is essential to develop a thorough understanding of the impact of substance abuse on mental and physical health outcomes and to identify new treatment approaches for substance use disorders (SUDs) (Loftis and Huckans, 2013) the aim of this study to found the effect of abuse substance on some immune parameters.

2. Materials and methods

2.1. Patients and control groups

This study was done on a group of prisoners in the Najaf police prison (Najaf governorate), who were drug users, for period from June to August 2018. This study included 60 persons who abuse taken, 20 persons were not abuse apparently, the group was selected as a control group. The ages of persons and control group ranged between eighteen to twenty five years. Laboratory tests were conducted in detection the effect of drug on immunity in public health laboratory at AL Najaf.

2.2. Blood Samples

Five ml venous blood was collected from each abuse users and control groups of the study. Samples were place in tubes containing a gel. The serum was separated by centrifuge at 3000 rpm for 15 minutes, and the serum was distributed to Eppendorf tube and then stored in a deep freeze at -20°C until used.

2.3. Urine Samples

Five ml urine was collected from each subjects of the study. samples were place in disposable cups, and distributed to rapid test panel (urine).

1- The pouch was brought at room temperature before opening it. the Test panel was removed from the seal pouch and used it within one hour.
2- The cap was removed.
3- With arrowed pointing to word the urine specimen, Immerse of the selector panel vertically in the urine model for 10-15 seconds and Immerse of to the level of the crossed lines not above the arrow on the test panel. The cap was replaced and test panel was placed on a non-absorbent flat surface.
4- Started the timer and waited for the colored line (s) to appear.
5- The adulteration strips is read and alcohol strip between 3-5 minutes according to color chart provided separately/on foil pouch.
6- The drug strips result were reading at 5 minutes. The result after 10 minutes did not interpret.

IgG and IgM concentration The plate was removed from its envelope and leaved to standard at room temperature for few minutes so that could any condensed water in the well evaporate. The wells were filled with 5 µl of sample and/or controlled and waited it had been completely adsorbing before handing the plate. The plate was Closed and placed it in a moist chamber for 96 hours and then the diameter of precipitation ring were demined.

3. Results and Discussion

Abuse substance were detected by using multi Drug test penal the colour change in kite determine as figure(1). The alcohol and other appear line positive.
Results of drug detection in urine showed 50 persons positive and 20 negative. The results appeared the alcohol was higher compared with other substance 18%. Others appeared 16, 13, 12, 11, 9, 9, 7, 5% for K2, BZO Alcohol, AMP, AMP+MDMA+K2, K2+AMP, AMP+BZO+THC, THC+BZO+K, THC respectively. Fig(1)

**Figure (1):** The percentage of abuser substance according rapid test for urine Alcohol, k2- synthetic Marijuana, AMP- Amphetamine, BZO- Benzodiazapines, THC- Marijuna, MDMA- Methylendioxymethamphotamine

Chromatography is one of the fastest and most common tests, so drug discovery and some drugs are used as one of the most common methods in emergencies and workplaces for accuracy and speed. This test is based on the ratio of soluble substances in urine, where adolescents and young people are screened. Even knowing the type of narcotic drug and prescription medication in case of emergency were the best ways to use them in identifying unknown substances. Alcohol and drugs vary substantially in their windows of detection, largely owing to their degree of fat solubility. For example, THC and other highly fat-soluble compounds have a very long half-life of elimination and can be detected in urine up to weeks after last use among heavy users levels may vary with urine concentration, the amount of drug used, and time since last use. Additionally, because highly sensitive drug testing may detect substances at limits far lower than therapeutic doses, Hadl and and Levy (2016).

Studies of cytokine levels in relation to alcohol exposure suggest that patients with liver disease have significantly altered circulating levels of cytokines. Consumption of alcohol (30 grams per day) increased interleukin-10 (IL-10) and decreased macrophage derived chemokine concentrations, as compared to controls. (Chiva-Blanch et al., 2012)

Similarly, studies show that there are slight increases in Type 1 helper T cell (Th1) activation in the absence of liver disease (Cook, 2000). However, human monocytes acutely exposed to alcohol show suppression of nuclear factor kappaB (NF-kB) mediated production of pro-inflammatory cytokines (Mandrekar et al., 2002), and acute alcohol treatment dose-dependently reduces IL-6, IL-12p40, IL-23, and IL-10 levels in bone marrow-derived dendritic cells obtained from mice (Rendon et al., 2012).
The effect of abuse substance on immunoglobulin concentrations. Table 1 appeared the IgG concentrations were increased significantly than control. While some abuser who was taken Amp, K2, THC, K2+BZO+THC, the IgG con. while decreased332.53, 690.766, 576.66, 476.6 respectively compared with control. Alcohol, BZO Alcohol, AMP+MDMA+K, AMP+BZO+THC the IgG in these groups appeared higher than control. IgM concentrations were increased with abuse substance users compared with control. Interleukin -10 concentrations pg/ml in serum f drug users compare with control table 2 other study found the abuser appeared different among groups this may be given that both stress and substance abuse have robust, reciprocal, and potentially synergistic effects on immune system cytokines, examined changes in peripheral cytokine levels in cocaine dependent individuals at baseline and following exposure to stressful imagery. Cocaine abusers demonstrated decreased basal IL-10 compared with social drinkers(Fox et al., 2012).

Table 1: Concentrations of IgG and IgM in drug users compare with control

| Types of drug | Concentrations of serum IgG M ± sd | P-value | Concentrations of serum IgM M ± sd | P-value |
|---------------|-----------------------------------|---------|-----------------------------------|---------|
| AMP           | 332.53±192.15                     | 0.096   | 79.266±4.53                       | 0.098*  |
| K2 AMP        | 826.23±235.15                     | 0.022*  | 143.6±115.29                      | 0.16    |
| K2           | 690.766±235.15                    | 0.037*  | 146.6±123.3                       | 0.17    |
| THC           | 576.66±370.91                     | 0.022*  | 136.4±61.57                       | 0.06*   |
| K2+BZO+THC   | 476.6±169.21                     | 0.04*   | 317.6±241.7                       | 0.15    |
| AMP+BZO+THC | 1616.6±1499.9                    | 0.203   | 334.6±251.7                       | 0.14    |
| AMP+MDMA+K   | 1480.83±1603.5                   | 0.251   | 143.16±115.29                     | 0.164   |
| BZO Alcohol  | 925.33±333.32                    | 0.232   | 214.4±55.98                       | 0.022*  |
| Alcohol      | 11475.35±13.14                   | 0.06*   | 80.1±51.23                        | 0.114   |
| All substance (total) | 912.49±512.35   | 0.00**  | 177.27±46.77                      | 0.00**  |
| Control      | 882.74±545.8                     | 0.131   | 61.3±26.5                         |         |

*Significant at p ≤0.05

Table 2: Interleukin -10 concentrations pg/ml in serum f drug users compare with control

| Types of drug | IL-10 concentrations M ± sd | P-value |
|---------------|-------------------------------|---------|
| AMP           | 104.04±57.4                   | 0.088*  |
| K2 AMP        | 47.15±2.8                     | 0.001** |
| K2           | 80.11±46.45                   | 0.069*  |
| THC           | 114.7±45.69                   | 0.04*   |
| K2+BZO+THC   | 94.5±36.94                    | 0.047*  |
| AMP+BZO+THC | 82.13±55.96                   | 0.126   |
| AMP+MDMA+K   | 81.54±42.72                   | 0.081*  |
| BZO Alcohol  | 40.69±5.08                    | 0.042*  |
| Alcohol      | 79.82±55.7                    | 0.131   |
| All substance (total) | 79.08±42.99 | 0.00** |
| Control      | 39.19±13.74                   |         |

Significant at ≤0.5

4. References

[1] Chiva-Blanch G, Urpi-Sarda M, Llorach R, Rotches-Ribalta M, Guillen M, Casas R, 2012. Differential effects of polyphenols and alcohol of red wine on the expression of adhesion
molecules and inflammatory cytokines related to atherosclerosis: a randomized clinical trial. Am J Clin Nutr.; 95:326–334.

[2 ] Cook RT. 2000, Cytoplasmic cytokines in the T cells of chronic alcoholics. Alcohol Clin Exp Res.; 24:241–243.

[3 ] Fox HC, D’Sa C, Kimmerling A, Siedlarz KM, Tuit KL, Stowe R, et al. 2012 Immune system inflammation in cocaine dependent individuals: implications for medications development. Hum Psychopharmacol.; 27:156–166.

[4 ] Hadland E.S., and Levy S., (2016) Objective testing – urine and other drug PMC 25(3): 549–565.

[5 ] Loftis JM, Choi D, Hoffman W, Huckans MS. 2011 Methamphetamine causes persistent immune dysregulation: a cross-species, translational report. Neurotox Res.; 20:59–68.

[6 ] Loftis MJ. and Huckans M. 2013, Substance use disorders: Psychoneuroimmunological mechanisms and new targets for therapy, Pharmacol Ther. PMC 01, 139(2): 289–300

[7 ] Mandrekar P, Bellerose G, Szabo G. 2002. Inhibition of NF-kappa B binding correlates with increased nuclear glucocorticoid receptor levels in acute alcohol-treated human monocytes. Alcohol Clin Exp Res.:1872–1879.

[8 ] Rendon JL, Janda BA, Bianco ME, Choudhry MA. 2012. Ethanol exposure suppresses bone marrow-derived dendritic cell inflammatory responses independent of TLR4 expression. J Interferon Cytokine Res.; 32:416–425.

[9 ] Schleifer SJ. 2007, Psychoneuroimmunologic aspects of alcohol and substance abuse. Psychoneuroimmunology (4); 1:549–561.