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Immunological Assessment of addicts

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Abstract

The aim of this study is to investigate some aspects of immunologic response among Egyptian addicts. The study was conducted on 33 drug addicts who were admitted to hospital for treatment. They were males with age range (19-30; mean 24.73 years). They were followed up at 2-weeks intervals for one month. Blood samples from 18 addicts and 10 non-drug-user control blood donors were evaluated for some lymphocyte immunophenotypic markers by flow cytometric analysis. Addicts showed significantly ($P < 0.001$) decreased percentages of both T-helper ($CD4^+$) and T-cytotoxic ($CD8^+$) compared with controls. There was also significant ($P < 0.05$) reduction of $CD4^+/CD8^+$ lymphocyte ratio. Sera from all addicts, whether on hospital admission or follow-up samples were subjected to the following investigations. Some blood-borne viral infections were investigated; hepatitis B surface antigen (HBsAg) was present in 1/33 (3%) addicts. Hepatitis C virus antibodies (anti-HCV) were detected in 11/33 (33.3%) addicts versus 1/10 (10%) of controls. Human immunodeficiency virus antibodies (anti-HIV) were present in one serum out of 33 (3%) addicts. Reactivation of cytomegalovirus (CMV) latent infection was assessed by detection of anti-CMV IgM in 1/33 (3%) of addicts on hospital admission, which persisted during the first two weeks, then disappeared on the 4^{th} week. Antibody activity as neutralizing antibodies to polioviruses 1,2 and 3 were tested in cell culture, the antibody titer was higher in follow-up samples than on the time of hospital admission. Antistreptolysin O (ASO) was detected in serum of one addict (3%) on hospital admission and in another addict 2-weeks later which indicated streptococcal infection. The acute inflammation phase C-reactive protein (CRP) was high in 7/33 (21.2%), 3/33 (9.1%) and 1/33 (3%) upon hospital admission, 2-weeks and 4-weeks, after cessation of drug use respectively.

Introduction

There are considerable evidences which suggest that drug addiction has an effect on the humoral immunity and cell mediated immunity which decreases host resistance to infection. (Donahoe et al., 1987, Eisenstien et al., 1996).

Opiates have been shown to produce profound effects on the immune system (Arora *et al.*, 1990; Eisenstein and Hilburger, 1998). The opiate drugs of abuse are immunosuppressive, both in humans and in experimental laboratory animals (Eisenstein et al., 1996). For example, morphine treatment results in the suppression of phagocytosis by macrophages (Rojavin et al., 1993) and polymorphnuclear cells (Pacifici et al., 1994), as well as inhibition of

chemotactic response (Stefano et al., 1993) and cytokine production (Peterson et al., 1987) by peripheral blood mononuclear cells. Also, they can cause suppression of natural killer (NK) cell activity (Carr et al., 1994), T-cell CD2 antigen expression (Donahoe et al, 1987), proliferative responses to mitogens (Biagini et al., 1995) and antibody production (Eisenstein et al., 1990).

The effect of opiates on the cells of the immune system was first reported in 1979 by Wybran, and his colleagues suggesting that human blood T-lymphocytes possess specific receptors for morphine. Donahoe et al., (1987), have confirmed this finding and also have shown that opiate exposure may alter the expression of the E-rosette receptor marker ($CD2^+$), T-helper/inducer ($CD4^+$) and T-suppress - or/cytotoxic ($CD8^+$) markers. Opiate-induced alteration in the micro - displacement of receptors has been proposed as a potential mechanism of these findings.

Addiction to opium alkaloid is accompanied by an increased incidence of blood born infections bacterial, fungal, protozoal and viral infections. Pulmonary infections, skin site of injection cellulitis and or thrombophlebitis, viral hepatitis and HIV (Hilburger et al., 1997b; Hagan, 1998; Trišler et al., 1999) were common in addicts.

As well as, several studies have suggested that cannabinoids showed enhanced mortality upon Listeria monocytogenes and herpes simplex type II virus infection (Morahan et al., 1979). Subsequent animal studies confirmed that cannabinoids decreased anti -bacterial activity of the host immune system (Ashfaq et al., 1987). Martin and Szara (1998), suggested that cannabinoids aggravate immunosup - pression.

It has been reported that other drugs of abuse such as cocaine, amphetamines and narcotics can produce depression of both cellular and humoral immune response (Cushman and Grieco,1973; Layon et al., 1984; Bagasra et al., 1989).

These findings prompted us to examine some immune activity among Egyptian drug addicts. These include:

The immunophenotypic markers on lymphoid cells e.g. T-helper cells ($CD4^+$) and T-cytotoxic ($CD8^+$) lymphocytes counts by flow cytometry.

Blood-borne infections as carriers of hepatitis B surface antigen (HBsAg), hepatitis C antibodies (anti-HCV) and human immunodefeciency virus antibodies (anti-HIV) by enzyme immunoassay.

Reactivation of cytomegalovirus latent infection by determination of anti-CMV IgM using ELISA.

Antibody activity as neutralizing antibodies to poliovirus and anti-streptolysin O.

Measurement of C-reactive protein as inflammation acute phase protein.

Material and Methods

Study Subjects:

Thirty-three addicts to various drugs (polydrug users) who were admitted to AL-Khanka Hospital, Qalyubiyia Governorate, were chosen randomly. All subjects were males whose age range was 19-30 with a mean 24.73 years.

Samples:

Blood samples were collected aseptically from the 33 subjects at the time of hospital admission. The sera were aliquoted and stored at -50°C until used. At the same time, 2ml blood were drawn on EDTA anticoagulant from 18 of these individuals to determine $CD4^+$

and $CD8^+$ T- lymphocytes by flow cytometry on the day of collection.

Follow- up samples:
During hospitalization, studied subjects were followed up. The second blood samples were collected 2 weeks after admission from all addicts . The last samples were taken one month after the date of admission (4 weeks after cessation of drug use) from 30 addicts(3 did not complete the study).

Control group
Ten healthy male blood donors at the same age and with no history of drug use were selected from Ain-Shams University Blood Bank for control blood samples collection.

Methods:

Determination of CD^+4 and CD^+8 T-lymphocytes by flow cytometry:
One hundred microlitres of fresh blood with EDTA, were incubated for 20 minutes in dark with 20 µl monoclonal antibodies [anti-$CD4^+$ fluorescein isothiocyanate (FITC) labelled], and [anti-$CD8^+$ phycoerythrin (PE) labelled], obtained from (Becton-Dickinson; San Jose, CA). Two milliliters lysing solution were added and incubated for 15 min., then centrifuged for 10 min. at 7,000 r.p.m. and washed twice with cold PBS. Supernatant was removed and the pellet was suspended in PBS to be ready for analysis by flow cytometer. A negative control tube was run in parallel using unstained lymphocytes. Lymphocytes suspensions were analyzed on FACScan 82758 flow cytometer (Becton-Dickinson). A gate was drawn around lymphocytes according to forward scatter and side scatter. A dot plot was made and quadrants were drawn to differentiate the FITC stained $CD4^+$ cells on X- axis and PE stained $CD8^+$ cells on the Y- axis.

All collected sera were subjected to the following investigations.

Detection of carrier state to the following viruses:

- Hepatitis B surface antigen (HBsAg) by enzyme immunoassay (Abbott ,mu -rex; Version 3) as instructed by the manufacturer.
- Antibodies to hepatitis C virus (anti- HCV Ig G) by ELISA was performed according to manufacturer's instructions (Murex, version 4.0).
- Antibodies to human immuno -deficiency virus (HIV): by enzyme immunoassay was done as instructed by the manufacturer. The kit was obtained from (Abbott, murex HIV- 1.2.0) for detection of antibodies to HIV- 1, HIV- 1 group O and HIV- 2.

Reactivation of latent viral infection:
by determination of cytomegalovirus (CMV) IgM by ELISA (Captia, Trinity Biotech; USA). The assay was performed according to manufacturer's instructions.

***Neutralizing antibodies*:**
to polioviruses 1,2 and 3 by viral neutralization in Vero cell culture according to Melnick et al, (1979).

Antistreptolysin O (ASO) antibodies:
were tested for by latex agglutination (Biotec lab. UK). Agglutination indicates that the level of ASO is 200 IU or greater.

Detection of C-reactive protein (CRP):
by commercial kit (Biotec lab U.K.) latex agglutination indicates a raised CRP level i.e. over 6mg/ liter.

Statistical analysis:
Using the student t-test according to Kurz, (1983).

Results:

General characteristics and addiction history:

The studied subjects were 33 males whose drug addiction history is shown in table (1).

Table (1) Demographic data of drug addicts

Characteristic	Number (percentage)
- Number	33 (all males)
- Age	19-30 (mean 24.7 years)
-Marital status:	
- Single	24 (72.7)
- Married	9 (27.28)
***- Drugs abused:**	
- Opiates	20(60.6)
- Cannabinoids	21 (63.64)
- Hypnotics	27 (81.8)
- Stimulants	3 (9.09)
- Polydrug users	3(9.09)
* **-Drug adminstration:**	
- Intravenous (I.V.)	16 (48.48)
- Oral	28 (84.85)
- Smoking	20 (60.61)
- Snuffing	7 (21.21)
- Duration of addiction:	
- less than 1 year	1(3)
- 1-5 years	20 (60.6)
- 6- 10 years	10 (30.3)
- 11-20 years	2 (6)

* Subjects were addicts of more than one drug and used variable modes of administration. Percentage in parenthesis.

$CD4^+$ and $CD8^+$ T- lymphocytes flow cytometric analysis:

Eighteen addicts and 10 controls peripheral blood lymphocytes were tested. $CD4^+$and $CD8^+$lymphocytes counts were significantly decreased (P<0.001). The percentages of T-cells bearing $CD4^+$and $CD8^+$ phenotypes in addicts were lower when compared to the controls (Table 2).

The ratio between $CD4^+/CD8^+$ was significantly lower than that for healthy controls (P<0.05). Among the eighteen addicts who were assayed by flow cytometry, 6 (33.3%) had inverted ratios. Three of them were heroin abusers besides other drugs, the remaining 3 were bango abusers with other combination of different drugs via different modes of administration. The duration of drug addiction ranged from 4 - 10 years. Also, 6 (6/18,33.3%) of them were HCV- seropositives and 3/6 (50%) had $CD4^+/CD8^+$ inverted ratio.

Table (2) $CD4^+$ and $CD8^+$Count in addicts versus control

Condition	CD_4^+	CD_8^+	CD_4^+ / CD_8^+
Control			
Range	22.6 – 28.2	16.9 – 21.5	1.18-1.41
Mean ± S.E.	25.58 ± 0.54	19.744 ± 0.63	1.3 ±0.0314
Addicts*			
Range	3.2 – 13.9	2.7 – 13.6	0.5 – 1.7
Mean ± S.E.	7.406 ± 0.698	7.26 ± 0.813	1.087 ± 0.085
P<	0.001	0.001	0.05

P< 0.05 = statistically significant.
P< 0.001 = highly significant. * Samples were taken on admission.

Detection of hepatitis B virus surface antigen:

One of 33 (3%) addicts was HBsAg carrier (Table 3). He abused bango, alcohol, cannabis and tablets by oral and smoking routes. He was polydrug addict for 7 years. Non of the control subjects was HBsAg carrier.

Detection of hepatitis C virus antibodies:

HCV antibodies were present in 11/33 (33.3%) addicts sera versus 1 / 10 (10%) of healthy control sera (Table 3). Nine of these HCV-seropositive addicts 9/11 (81.8%) were I.V. drug users, seven of them were addicts to heroin and other drugs. Regarding the duration of addiction, two were addicts for 2 years, six were for 4-6 years, two were for 10 years and one was for 20 years.

Detection of human immunode - ficiency virus antibodies :

Antibodies to HIV were detected in one serum out of 33 (3%) sera from these addicts. He was heroin, cannabis, hypnotics and stimulants polyuser for 20 years. He also was HCV- seropositive (Table 3).

Table (3) Viral co-infection markers in groups studied

Subjects	Number of samples	HCV		HbsAg		HIV	
		N	%	N	%	N	%
Control:	10	1	(10)	0		0	
Addicts:							
On Admission	33	11	(33.3)	1	(3)	1	(3)
After 2 weeks	33	11	(33.3)	1	(3)	1	(3)
After 4 weeks	30	11	(36.6)	1	(3)	1	(3.3)

HCV = Hepatitis C virus antibodies. HBsAg = Hepatitis B virus surface antigen.
HIV = Human immunodeficiency virus antibodies.

Detection of cytomegalovirus reactivation:

Anti-CMV IgM was present in 1of 33 (3%) addicts on hospital admission. The IgM anti-CMV persisted during the first two weeks of admission then

disappeared in the following two weeks. IgM anti-CMV was detected in another addict after 2-weeks of admission then was undetectable after 4 weeks of drug cessation. He was polydrug user for 3 years. He addicted heroin, cannabis and hypnotics for 19 years (Table 4).

Table (4) IgM anti CMV reactive and active infection

Subject	No of Samples	IgM –anti CMV	
		No.	%
Control:	10	0	
Addicts:			
On Admission	33	1	(3)
After 2 weeks	33	2	(6)
After 4 weeks	30	0	

CMV: Cytomegalovirus. No: number.

Detection of neutralizing antibo -dies against polioviruses:

Neutralizing antibodies against poliovirus type 1 were found at low titer (280 NT_{50}U/ml, i.e.50% neutralizing units per milliliter serum) in 6/33 (18.2%) of addicts sera on admission, then reached 2/30 (6.7%) after one month therapy versus 2/30 (6.7%) of controls. High titer (20047 NT_{50}U/ml i.e. 50% neutralizing units per milliliter serum) of antibodies were found in 1/33 (3%) on admission, and 5/30 (16.7%) 4 weeks after cessation of drug abuse, versus 1/30 (3.3%) in control group (Table 5; Fig. 1).

Poliovirus type 2 antibodies at low titer were detected in 10/33 (30.3%) of addicts on admission, and 2/30 (6.7%) one month after drug stoppage versus 2/30 (6.7%) of controls. High-titer antibodies were detected in 5/33 (15.2%) on admission, and in 2/30 (6.7%) after stopping of drugs versus 2/30 (6.7%) of controls (Table 6; Fig. 2).

Poliovirus type 3 antibodies were found at low titer in 10/33 (30.3%) in addicts at the time of hospital admission and in 3/30 (10%) of addicts after one month, and in 1/30 (3.3%) of controls. High titer antibodies were present in 1/33 (3%) of addicts on admission and in 4/30 (13.3%) after one month, hospitalization, versus 2/30 (6.7%) of controls (Table 7; Fig. 3).

Table (5): Antibodies neutralizing poliovirus type 1 among drug addicts versus controls

Neutralizing antibody titer		8	16	32	64	128	256	512	Number of reaction		No of high * antibody titer		No. of low ** Antibody titer	
									Total No.	%	Total No.	%	Total No.	%
Admission		6	6	11	3	6	--	1	33/33	100%	1/33	3%	6/33	18.2%
Post-therapy	2weeks	1	1	10	8	9	--	4	33/33	100%	4/33	12%	1/33	3%
	4weeks	2	--	6	4	10	3	5	30/30	100%	5/30	16.7%	2/30	6.7%
Control		2	--	21	--	6	--	1	30/30	100%	1/30	3.3%	2/30	6.7%

Table (6): Antibodies neutralizing poliovirus type 2 among drug addicts versus controls

Neutralizing antibody titer		8	16	32	64	128	256	512	Number of reaction		No of high* antibody titer		No. of low. ** Antibody titer	
									Total No.	%	Total No.	%	Total No.	%
Admission		10	3	4	4	6	1	5	33/33	100%	5/33	15.2%	10/33	30.3%
Post-therapy	2weeks	3	3	15	4	6	1	1	33/33	100%	1/33	3%	3/33	9.1%
	4weeks	2	4	10	3	8	1	2	30/30	100%	2/30	6.7%	2/30	6.7%
Control		2	--	15	--	11	--	2	30/30	100%	2/30	6.7%	2/30	6.7%

Table (7): **Antibodies neutralizing poliovirus type 3 among drug addicts versus controls**

Neutralizing antibody titer		8	16	32	64	128	256	512	Number of reaction		No of high* antibody titer		No. of low. ** Antibody titer	
									Total No.	%	Total No.	%	Total No.	%
Admission		10	6	4	4	7	1	1	33/33	100%	1/33	3%	10/33	30.3%
Post-therapy	2weeks	3	3	11	5	6	-	5	33/33	100%	5/33	15.2%	3/33	9.1%
	4weeks	3	3	9	4	5	2	4	30/30	100%	4/30	13.3%	3/30	10%
Control		1	-	19	3	5	-	2	30/30	100%	2/30	6.7%	1/30	3.3%

NTU= 50% neutralizing uints per milliliter serum * High antibody titer, when 20047 NT_{50}U/ ml serum.
** Low antibody titer, when 280 NT_{50}U/ ml serum.

Determination of antistreptolysin O:

Antistreptolysin O was positive in 1 of 33 (3%) addicts on admission, and in another one after two weeks of admission. None of the control sera was reactive for antistreptolysin (Table 8).

Determination of C-reactive protein:

C-reactive protein was high in 7 out of 33 (21.2%) addicts on hospital admission, in 3/33 (9.1%) of addicts two weeks after cessation of drug abuse and in one of 33 (3.3%) one month after admission. None of the control sera was CRP reactive (Table 8).

Table (8) Bacterial infection markers in drug addicts and control groups

Subject	**Number of Samples**	**ASO**		**CRP**	
		N	%	N	%
Control:	10	0		0	
Drug addicts:					
On Admission	33	1	(3)	7	(21.2)
After 2 weeks	33	1	(3)	1	(9.1)
After 4 weeks	30	0		0	

ASO = Antistreptolysin O; CRP = C-reactive protein; N= number.

Fig. (1) Neutralizing antibodies to poliov ius type 1 in addicts

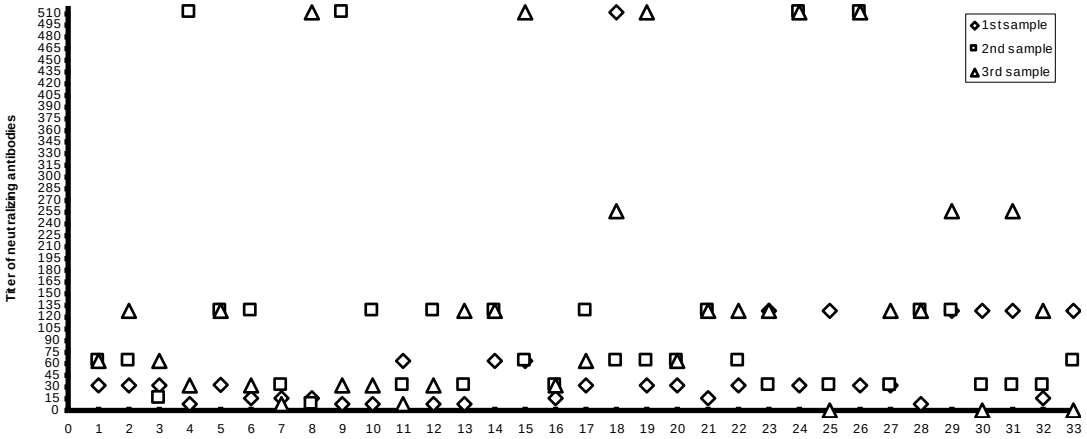


Fig. (2) Neutralizing antibodies to poliovirus type 2 in addicts

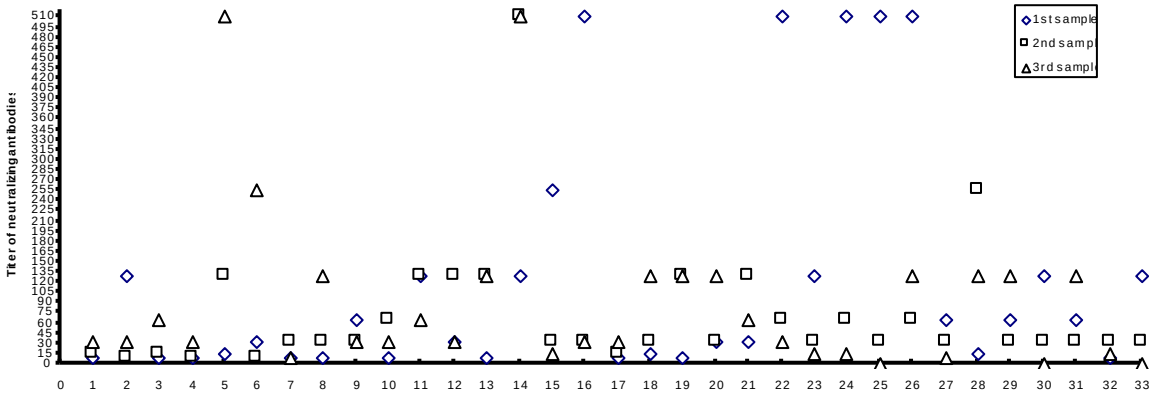
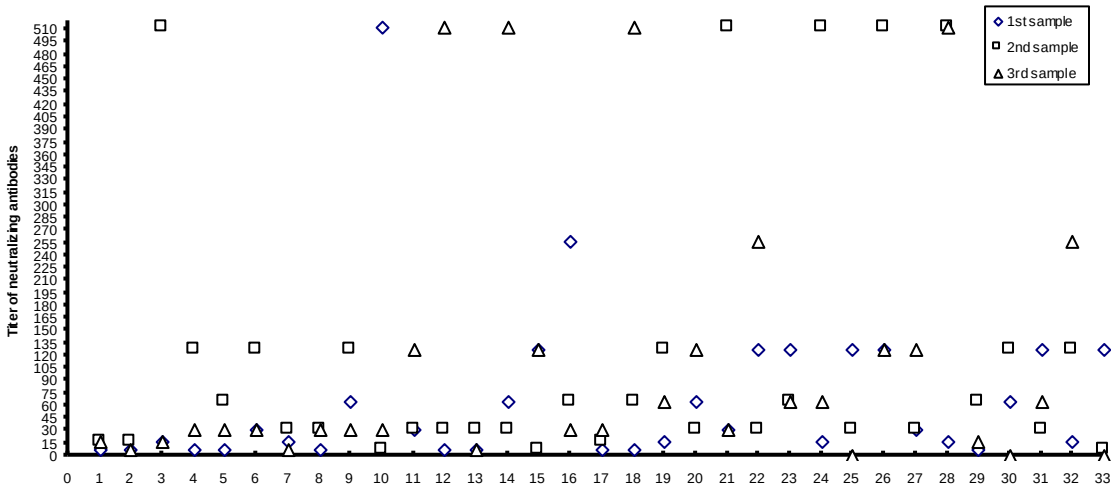


Fig. (3) Neutralizing antibodies to poliovirus type 3 in addicts



Discussion

Experimental studies in animals have allowed a clear delineation of a cause–and–effect relationship between opioid administration and alteration in T-cell function. Morphine has been shown to alter the ratio of $CD4^+$ and $CD8^+$ T-lymphocyte in both the spleen and thymus (Arora et al., 1990) when mice were implanted with a 75- mg morphine pellet. $CD4^+$ and $CD8^+$ ratio changes were observed in the peripheral blood of monkeys, which received daily injections of morphine for 2 years (Carr and France, 1993).

Studies that have examined the effects of morphine or heroin on various human peripheral blood lymphocyte subsets reported alterations of $CD4^+$ and $CD8^+$ lymphocyte populations (Hilburger et al., 1997a). However, two studies of T-cell subsets in the peripheral blood of heroin addicts reached opposite conclusions. One found reduced numbers of $CD4^+$ lymphocytes and increased numbers of $CD8^+$ lymphocyte ratio (Donahoe et al., 1987), and the other showed elevation of both $CD4^+$ and $CD8^+$ cells counts and no alteration of $CD4^+$ / $CD8^+$ ratio (Novick et al., 1989).

In another study, no abnormalities in T-cell subsets were observed in healthy, HIV- negative parenteral drug abusers and methadone-treated patients (Shine et al., 1987). Govitrapong et al., (1998) found that the immunological parameters of total T- lymphocytes (CD3), T-helper cells ($CD4^+$), cytotoxic T-cells ($CD8^+$), B-cells and natural killer cells immunophenotypic markers by flow cytometric analysis were altered in heroin addicts, 15- to 21 day and 6-to 24 months of withdrawal, when compared with controls. The heroin withdrawal subjects seemed to gradually reverse their immunological parameters to normal levels when withdrawal was sustained > / =2 years.

In our study, addicts of different drugs had significant decrease ($P<0.001$) in percentage of $CD4^+$ and $CD8^+$ T-lymphocytes associated also with reduced ratio significantly ($P<0.05$) when compared with control subjects. There were inverted ratios in 6 out of 18 addicts, which was in agreement with Layon et al., (1984) results.

Studies in addicts are complex, as many are polydrug users. The great danger of polydrug abuse is that there can be a synergistic effect among drugs that can produce a severe toxic, even lethal, result; any one drug taken alone would not have this effect (Giannini and Salby, 1989). Whether these observed alterations in cell number are due to drug abuse, drug adultrations or the high risk of needle stick infections among injection drug users. Acquiring hepatitis B and or C and or HIV or other virus infections may itself induce lymphocyte changes quantitative or qualitative. Above all life-style alterations and its bearing on immunity in addicts cannot easily tested (Strang, 1995).

It had been proposed that the duration of opiate exposure may be important in opiate- induced lymphocyte toxicity, as decreased T-helper / T-cytotoxic ratios have been reported to be present in addicts who had used heroin for more than 10 years (Donahoe et al., 1987). This is in agreement with our finding that the addicts with low percentage of $CD4^+$ and $CD8^+$ were drug abusers for 4-10 years.

In 1981, the aquired immuno -

deficiency syndrome (AIDS) was recorded in American male homosexuals and intravenous drug users (IVDUs) who consumed drugs by shared contaminated syringes. Despite using disposable sterile syringes, the HIV infections still increased (CDC, 1987).

In Egypt, 34 HIV infection were recorded in 1999 i.e. 0.05 per 100.000 of total population (WHO, 2000). It was proved that multiple viral infections are more serious than single viral infection. Root–Bernstein (1990), reported that the co-infection of CMV and HBV or CMV and Epestein-Barr virus or HCV and HIV co-infection produce more serious symptoms than solitary virus infection. In another study, Orestein et al.,(1997) concluded that AIDS patients suffering from dementia complex had associated CMV or mycobacteria infections.

In our study, there was one addict who had antibodies to HIV and HCV among 33 addicts (3%) which is considered high incidence if compared with health authorities acknowledged AIDS case rate (0.00005%) among Egyptians (WHO, 2000).

In the present study, HCV antibodies were present in 11/33 (33.3%) of addicts whereas the overall prevalence of antibodies to HCV in Egyptian general population was around 10-20% (Mohamed et al., 1996; Frank et al., 2000). Infection with HCV among these drug abusers was not an obvious needle stick or I.V. induced as there was only one (3%) who had HBsAg a sure blood borne infection.

In this study, the frequency of HBV antigenaemia is low compared with 7.9% and 8.2% of Egyptian general population and blood donors (Hassaballa and Hegazi 1994; Abdel-Wahab et al., 1996). This low percentage may be due to young age or the limited number of the study subjects.

Viral infected addicts were polydrug users who practiced different ways of drug abuse. It is obvious that a synergistic effect between these drugs led to an increased susceptibility to viral infections irrespective to mode of administration. In this study, there were two CMV recent infection or reactivation in 2/33 (6%) of addicts which is higher than what was observed in the general population (El-Sayed, 1990).

Root-Bernstein (1990) reported that cytomegalovirus infection, blood transfusion, opiate addiction or malnutrition in non-HIV patients led to alteration of $CD4^+$/ $CD8^+$ T lymphocyte ratios. This is in agreement with our results. We observed a decrease in $CD4^+$ & $CD8^+$ T lymphocyte counts plus an alteration in their ratio almost akin to the peripheral blood lymphocyte changes in AIDS. Also, among the 6 HCV- seropositives whose T-lymphocytes were assessed 50% of them had inverted $CD4^+$/ $CD8^+$ ratio that is in agreement with Thomas et al.,(1996) results.

In this study, the neutralizing antibodies to polioviruses 1, 2 and 3 were present in 100% of addicts and controls. In control group, 90% had moderate titer of antibodies to polioviruses 1,2 and 3, but 10% had low antibody titer to polio 1 or 2 and high titer to poliovirus type 3. This represents the immunological status of an Egyptian adult in a community covered by oral polio vaccination in expanded program of immunization of infants and mass vaccination campaigns. In addicts, the antibody titer to polioviruses types 1 and 3 was higher in follow-up samples than on the time of hospital admission. This may be due to drug stoppage and healthy diet during

hospitalization and decreased exposure to enteric virus infection. However, the titer of antibodies to polioviruses in addicts after withdrawal was higher than the control group. This high titer of antibodies may be due to improving immunological functions or poliovirus re-exposure and boaster effect immune response.

In this study, there was one addict (3%) who had high level of antistreptolysin O (ASO) which disappeared two weeks after drug stopping. Whereas, it was detected in the serum of another subject 2-weeks after hospital admission then disappeared at the 4^{th} week. The high titer of ASO is indicative of streptococcal infections.

Regarding the acute inflammation phase C-reactive protein, it was high in 7 cases out of 33 (21.2%) on hospital admission, then the number decreased to 3 (9.1%) after 2 weeks. After 4 weeks of hospital admission, one addict had high level of C-reactive protein, whereas no high level was detected among controls. Since C-reactive protein increased in specific and non specific inflammatory conditions as well as in organic diseases (Lindbäck et al., 1989), the high level of this protein in the investigated drug abusers tells there was an alteration or dysfunction in these addicts' body tissues.

In conclusion, the polydrug users in Egypt are subject to immune system downregulation in the form of altered percentage and ratio between $CD4^+$ and $CD8^+$ T-cells. They are at high risk of infections viral mostly blood-borne ones, and bacterial, and appreciable tissue inflammation.

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التقييم المناعى لمدمنى المخدرات

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حيث إن تعاطي المخدرات يؤثر على جهاز المناعة ، ويجعل المتعاطي عرضة لكثير من الأمراض الفيروسية والبكتيرية ، ولدراسة هذا التأثير في متعاطي المخدرات المصريين تم إجراء هذا البحث على مجموعة عشوائية مكونة من 33 شاباً مدمناً كلهم من الذكور وتتراوح أعمارهم بين 19 و 30 سنة. أدخلوا إحدى المصحات للعلاج من الإدمان. تم أخذ عينات دم منهم فور دخولهم المستشفى ومتابعتهم على مدى شهر ، وذلك بجمع عينات دم بعد أسبوعين وبعد 4 أسابيع لإجراء الاختبارات التالية :-

- تم جمع عينات دم على مانع تجلط من 18 مدمن فور دخولهم المستشفى لإجراء عد للخلايا الليمفاوية التائية باستخدام جهاز الفلوسيتوميتر ، وجد انخفاض شديد في متوسط عدد الخلايا التائية المساعدة (CD_4^+) وكذلك الخلايا التائية المثبطة ($CD8^+$) ذو دلالة إحصائية وكذلك انخفاض ملحوظ في النسبة بينهما ($CD4^+ / CD8^+$) ذو دلالة إحصائية أيضاً بالمقارنة بالمجموعة الضابطة.
- تم إجراء الاختبارات التالية على المدمنين في المجموعات الثلاث وكانت النتائج كالآتي :

1 - ارتفاع نسبة الإصابة بفيروس الالتهاب الكبدي (س) بنسبة 33.3% من المدمنين حيث يحملون الأجسام المضادة مقابل 10% في المجموعة الضابطة وذلك باستخدام اختبار الإليزا (ELISA anti - HCV)

2 - اكتشاف فيروس الالتهاب الكبدي (ب) بنسبة 3% بين المدمنين باستخدام اختبار الإليزا (ELISA- HBs Ag) ولم تظهر أي حالة موجبة بين المجموعة الضابطة.

3 - وجود الأجسام المضادة لفيروس العوز المناعي (HIV) في 3% من المدمنين باستخدام اختبار الإليزا (ELISA anti - HIV) ، ولم تظهر أي حالة موجبة بين المجموعة الضابطة.

4 - وجود الأجسام المناعية (Ig M) المضادة لفيروس السيتوميجالو (anti - CMV) باستخدام طريقة الإليزا ، في دم أحد المدمنين (3%) عند بداية دخوله المستشفى ، استمرت خلال فترة الأسبوعين الأوليين ، ثم اختفت في الأسبوع الرابع ، في حين لم يظهر أي حالة في المجموعة الضابطة.

5 - أظهرت نتائج الكشف عن الأجسام المضادة لفيروسات شلل الأطفال (1 ، 2 ، 3) باستخدام اختبار معادلة عدوى الفيروس في مزارع الخلايا الحية ، أن نسبة حاملي الأجسام المضادة (100%) سواء في المجموعة الضابطة أو مجموعة متعاطي المخدرات ، ولكن تبين وجود اختلافات في المعايرة لفاعلية الأجسام المضادة حيث وجد معايرة مرتفعة في عينات المتابعة.

6 - وفيما يتعلق بالكشف عن الأجسام المناعية المضادة الخاصة بالاستريبتوليسين (anti - Streptolysin 0) في مصل المدمنين ، وجدت هذه الأجسام في دم مدمن واحد (3%) عند دخول المستشفى اختفت بعد أسبوعين من التوقف عن التعاطي ، ولكنها ظهرت في دم مدمن آخر أثناء وجوده بالمستشفى ، واختفت في نهاية الأسابيع الأربعة ، في حين لم تظهر هذه الأجسام المضادة في دم المجموعة الضابطة.

7 - وبقياس كمية البروتين المتفاعل س C- reactive protein ، وجد أن كميته ارتفعت عن المعدلات الطبيعية في 7 حالات (21.2 %) عند بداية دخولهم المستشفى. ثم أخذت هذه النسبة في الانخفاض مع التوقف عن التعاطي ، حيث انخفضت إلى 3 حالات من 33 مدمن (9.1%) بعد أسبوعين من دخول المستشفى. ووصلت لحالة واحدة من بين 30 مدمناً (3.3%) بعد مضي أربعة أسابيع ، في حين لم يوجد هذا البروتين في أي من المجموعة الضابطة.

وتبين هذه الدراسة وجود انخفاض في الاستجابة المناعية في الأشخاص المدمنين في صورة انخفاض نسبة الخلايا التائية المساعدة والمثبطة بالإضافة لذلك فإنهم عرضة للأمراض الفيروسية والبكتيرية وخصوصاً التي تنتقل العدوى بها عن طريق الدم.