



THE ANALYSIS OF BIOCHEMICAL AND HEMATOLOGICAL PARAMETERS IN PSYCHIATRIC PATIENTS WITH A HISTORY OF IV DRUG ABUSE, ADDICTION AND HEPATITIS C IN AHVAZ CITY DURING 2012-2015

Seyyed Hossein Hassanpour^{1*} and Seyyed Zeinab Karami²

¹Young Researchers and Elite Club, Yasooj Branch, Islamic Azad University, Yasooj, Iran

²Department of Biology, Faculty of Basic Sciences, Yasouj University, Yasouj, Iran

ARTICLE INFO

Article History:

Received 6th May, 2017

Received in revised form 3rd June, 2017

Accepted 18th July, 2017

Published online 28th August, 2017

Key words:

HCV, IV drug abuse, Psychiatric patients, Serum level

ABSTRACT

The contaminated injection equipment have pivotal role in spread of HCV infection. IV drug users are one of the populations with high risk of HCV infection. Objectives: our goal was to evaluate the role of a hazardous action (intravenous injection with contaminated equipments) in threat of public health. In this study, we collected data on 37 psychiatric patients with a history of IV drug abuse and addiction with HCV and compared to psychiatric patients with a history of IV drug abuse without HCV. Here was measured biochemical and hematological parameters and analyzed by SPSS. We found levels of AST and ALT significantly increased, but ALP and albumin none significantly decreased in patients ($p \leq 0.05$). Moreover, PT, aPTT and ESR levels in patients were slightly higher than control group. In addition, a significant correlation between AST and ALT to serum creatinine in patients may indicate a relationship between kidney problems followed by hepatic damage. The mean value of FBS, Tg and cholesterol levels were nearly similar in both groups. The serum level of calcium and phosphate in patients were significantly lower and higher than control group respectively ($p \leq 0.05$). There was a reduction and increment in serum level of free T3 and free T4 respectively and the level of TSH in patients was nearly 3 times higher than control group. Thus, primary hypothyroidism has been seemed at patients. Finally, we concluded the evaluation of IV drug abuser for prognosis of HCV widespread is very important.

Copyright © 2017 Seyyed Hossein Hassanpour and Seyyed Zeinab Karami. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

According to recent statistic, about 185 million of people suffer from HCV in around of worldwide and the amount of mortality is 350,000 cases annually. This people usually are not aware from their infection and when are aware that the treatment is very difficult.^[1] Intravenous injection can be a risky behavior, particularly shared use or reuse of injection equipments that commonly observed in intravenous drug abusers.^[2,3,4] One of the groups in exposure infection with HCV is intravenous drug abusers and this issue has become a major problem in society.^[5,6] However, the studies have been showed that 30-50% the prevalence of hepatitis C belongs to among intravenous drug users, so that in individual with a long history, May about %60 infect to HCV.^[5,7,8] The risk of HCV spread through using injection equipment is 10 times more than spread of HIV.^[9] Statistics have been determined that about 20% of Iranian population are addicted to drugs and is the prevalence of HCV nearly 1% in this country.^[10,11,12] Probably the increment of addiction in Iran is inevitable due to neighbor to Afghanistan as one of the main sources of drugs.^[13] This study was performed according to our previous

studies about mental disorders and effect of different compounds on serum parameters in these diseases.^[14,15] Because HCV infection is often without symptoms and usually transmits by using common syringe and uncontrolled sexual behavior. Thus, the evaluation of HCV in high risk people, especially in patients with a history of injection drug abuse in order to management and control the disease is very valuable.^[16] In this study, we examined biochemical and hematological parameters in serum of psychiatric patients with a history of intravenous drug and HCV in the city of Ahvaz during 2012-2015.

METHODS

The evaluation of biochemical and hematological parameters In this case, due to the high specificity and limits of society, we used purposive sampling model. Thirty seven psychiatric patients with a history of IV drug abuse and HCV participated in this study. Psychiatric patients with a history of IV drug abuse without HCV were selected as control group. The average age of both groups was 35 years-old. Sampling was performed with sterile syringe and subsequently serum

separated by centrifuge (1500 RPM, 5 min). Biochemical and hematological parameters were assessed according to instructions of commercial kit (Pars Azmone, Tehran, Iran) with an automatic analyzer (Biotechnica BT-3000 plus Chemistry Analyzer, Italy). The measurements of thyroid biomarkers (free T3, free T4, and TSH) were performed by ELISA method. (Monobind, Inc. Costa Mesa, USA)

Statistical analysis

All data are show as mean \pm SD. We used SPSS (version 16) software for analysis of obtained results. Independent Samples Test was performed for the comparison of between groups. As purpose, evaluation of correlation among parameters in patient group, we used Pearson correlation test. The significant different was considered $p \leq 0.05$.

RESULTS

The results were determined that biomarkers of liver (AST, ALT) significantly higher than control group ($p \leq 0.05$). In addition, the levels of ALP and albumin were none significantly lower than control group ($p \leq 0.05$) (table 1). As purpose, the examination of inflammation associated with infection, we measured erythrocyte sedimentation ratio (ESR). We found that this parameter was slightly increased in the patients (table 1). It were also showed that measurement of prothrombin time (PT) and Activated Partial Thromboplastin Time (aPTT) as biomarkers extrinsic and intrinsic pathways of coagulation respectively in patients group were slightly raised in compared to control group (table 1). As depict table 1, the mean value of serum creatinine level was nearly similar to than control group and it also had a significant correlation with the level of AST and ALT ($r = 0.613$, $p = 0.001$) and ($r = 0.658$, $p = 0.000$) respectively (table 2). We determined that BUN level was incremented in patients but as non-significant (table 1), thus probably there was risk of kidney damage followed by liver enzymes increase as indicator of liver damage. Our study determined that only one patient had serum triglycerides above 200mg/dl and also showed serum cholesterol above 200 mg/dl in three patients.

Table 1 The evaluation of different parameters in control and patient groups

Parameters	group	
	control	Patient
Age	35.45 \pm 8.45	35.32 \pm 8.30
AST (IU/L)	21.15 \pm 5.76	58.29 \pm 32.84*
ALT (IU/L)	19.45 \pm 6.40	76.45 \pm 49.05*
ALP (IU/L)	220.81 \pm 56.42	214.83 \pm 77.00
Albumin (gr/dl)	4.85 \pm 0.24	4.50 \pm 0.81
ESR (mm/hr)	9.19 \pm 6.24	10.83 \pm 13.79
PT (sec)	13.00 \pm 0.25	13.09 \pm 0.68
aPTT (sec)	34.80 \pm 2.77	36.62 \pm 3.78
BUN (mg/dl)	11.54 \pm 2.57	12.35 \pm 3.48
Creatinine (mg/dl)	0.79 \pm 71.02	0.79 \pm 69.74
Calcium (mg/dl)	9.62 \pm 0.62	9.20 \pm 0.59*
Phosphate (mg/dl)	3.98 \pm 0.48	4.23 \pm 0.43*
FBS (mg/dl)	86.13 \pm 16.24	85.89 \pm 16.00
Triglyceride (mg/dl)	97.10 \pm 62.73	113.71 \pm 71.25
Cholesterol (mg/dl)	143.86 \pm 34.23	156.09 \pm 45.83
T4 (μ g/l)	6.96 \pm 1.61	7.60 \pm 0.76
T3 (ng/l)	1.24 \pm 12.03	1.09 \pm 0.31
TSH (mIU/L)	0.46 \pm 8.45	1.48 \pm 8.30*

The results depict as mean \pm SD and analyzed to Independent Samples Test using SPSS version 16.

* show a significant different to control group ($p \leq 0.05$).

In this study, almost 90% patients have fasting blood sugar below 100 mg/dl, and only 2.7% of them have fasting blood

glucose above 126 mg/dl compared with the control group (table 1). In fact, was not showed diabetes subsequently the elevation of liver enzymes. We found that serum level of calcium in patient group was significantly decreased in compared to control group ($p \leq 0.05$). The mean value of phosphate serum was observed that this parameter at patient was significantly raised ($p \leq 0.05$) (3.98 and 4.23 mg/dl respectively). It was observed none significantly reduction in level of free T3, while free T4 in patient group was increased but as non-significant (table 1). Was also observed about 3 times increase in TSH level, because the mean value of thyroid stimulating hormone (TSH) in control and patient groups was 0.46 and 1.48mIU/L respectively. Deadly stimulation of TSH in patients resulted from a feedback response to thyroid hormones and indicated primary hypothyroidism.

Table 2 Pearson correlation test among different parameters

p value	Pearson Correlation	Correlations
0.000	0.711	ALT , AST
0.012	0.753	ALT , ALP
0.001	0.613	AST , CR
0.000	0.658	ALT , CR

$p \leq 0.05$ was set as significant different between parameters.

DISCUSSION

Our study investigated the evaluation of relation between intravenous drug abuse and prevalence of HCV through measurement of biochemical and hematological parameters in psychiatric patients with a history of IV drug abuse and hepatitis C. It has been reported that about 60-85% patients with HCV would infected to chronic infection. Since most patients during chronic infection are asymptomatic or have nonspecific symptoms, thus prognosis is very important.^[17] Erythrocyte sedimentation rate (ESR) is one of the biomarkers of infection and has been found that increases under conditions such as infection and inflammation.^[18,19] It has well been known that the levels of serum transaminase such as AST, ALT are valuable for assessing liver disease, because they increment indicates liver damage.^[20] In addition, was demonstrated that chronic hepatitis leads to reduction of serum albumin and can also occur increment more than three second PT in viral hepatitis.^[20] Significant reduction of proteins production and coagulation factors occur only in the end stages of liver damage and cirrhosis.^[21,22] Here, was observed a significant increase in serum AST and ALT concentration of patients in compared to control group ($p \leq 0.05$). However none significant reduction of albumin and ALP and slight increment of PT, aPTT and ESR was showed that there was not damage the in end stage. In previous studies, were confirmed that increase of serum creatinine and plasmacyroglobul in following treatment with interfere on, indicate renal complications.^[23] Our study showed that due to significant correlation between serum creatinine to AST and ALT there was the risk of kidney injury followed by liver damage. In addition, we determined significant reduction and increase in calcium and phosphate in patient group respectively. Was also observed the prevalence of type 2 diabetes mellitus in liver disease for instantnon alcoholic fatty liver, cirrhosis and viral hepatitis.^[24] Mehta *et al.* 2001 showed that the prevalence of diabetes would increase approximately four times in people with HCV.^[25] The study of Quershi and colleagues 2002 confirmed that about 19.4% people with HCV in chronic status infected to diabetes. While prevalence of diabetes is about

5.6% in patients without hepatic disorder.^[26] Here was observed that there was no relationship between liver injury to fasting blood sugar, cholesterol and triglyceride levels. The liver disorder, spatially acute hepatitis associated with reduction free T3 and free T4.^[27] It has well been confirmed the high prevalence of thyroid disorders among patients HCV, whom received interferon, but it is controversial in patients that untreated with interferon. Moreover, there is also a significant association between hypothyroidism and liver disease in patients with HCV.^[23] We well demonstrated that the level of free T3 and free T4 in patients none significantly decreased and increased in compared to control group, respectively ($p \leq 0.05$). While the serum TSH of patients significantly higher than control group ($p \leq 0.05$) (about three times), probably due to feedback response. Usually occur autoimmune disorders after HCV for example; there is possibility of hypothyroidism caused by thyroid autoimmunity by TAB and TPO autoantibody.^[28,29] In the end, we concluded that the use of contaminated injection equipments have pivotal role in the spread of HCV and the evaluation of intravenous drug users as a high-risk group, in order to prevent the spread of infection in the community is very important.

Acknowledgments

We thank specially Young Researchers and Elite Club, Yasooj Branch, Islamic Azad University, Yasooj, Iran due to cooperation in this study

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article

Reference

1. Organization, W.H. 2014. Guidelines for the screening, care and treatment of persons with hepatitis C infection. *World Health Organization*.
2. Esteban, J.I., Sauleda, S., Quer, J. 2008. The changing epidemiology of hepatitis C virus infection in Europe. *Journal of hepatology*, 48(1), 148-162.
3. Schleicher, S., Schieffer, M., Jürgens, S., Wehner, H., Flehmig, B. 2004. Evidence of multiple hepatitis virus infections in autopsied materials of intravenous drug addicts. *Igiene e sanita pubblica*, 61(5), 435-450.
4. Singer, M., Stopka, T., Siano, C., Springer, K., Barton, G., Khoshnood, K., de Puga, A.G., Heimer, R. 2000. The social geography of AIDS and hepatitis risk: qualitative approaches for assessing local differences in sterile-syringe access among injection drug users. *American Journal of Public Health*, 90(7), 1049.
5. Demetriou, V.L., van de Vijver, D.A., Hezka, J., Kostrikis, L.G. 2010. Hepatitis C infection among intravenous drug users attending therapy programs in Cyprus. *Journal of medical virology*, 82(2), 263-270.
6. Gerberding, J.L. 1994. Incidence and prevalence of human immunodeficiency virus, hepatitis B virus, hepatitis C virus, and cytomegalovirus among health care personnel at risk for blood exposure: final report from a longitudinal study. *Journal of infectious diseases*, 170(6), 1410-1417.
7. Farzanegan, H. 1979. The prevalence of HBs Ag, HBs Ab and HBs Ab in Healthy blood donor and high risk group in Iran. *Sang*, 173-82.
8. Sweeting, M.J., Hope, V.D., Hickman, M., Parry, J.V., Ncube, F., Ramsay, M.E., De Angelis, D. 2009. Hepatitis C infection among injecting drug users in England and Wales (1992-2006): there and back again? *American journal of epidemiology*, kwp141.
9. Vickerman, P., Hickman, M., May, M., Kretzschmar, M., Wiessing, L. 2010. Can hepatitis C virus prevalence be used as a measure of injection-related human immunodeficiency virus risk in populations of injecting drug users? An ecological analysis. *Addiction*, 105(2), 311-318.
10. Alavian, S.-M., Adibi, P., Zali, M.-R. 2005. Hepatitis C virus in Iran: Epidemiology of an emerging infection. *Arch Iranian Med*, 8(2), 84-90.
11. Drugs, U.N.O.o., Crime. 2010. World drug report 2010. United Nations Publications.
12. Tait, R. 2005. Iran faces up to its most lethal threat-drugs. *The Guardian*.
13. Razzaghi, E., Rahimi, A., Hosseini, M., Chatterjee, A. 1999. Rapid Situation Assessment (RSA) of drug abuse in Iran. Prevention Department, State Welfare Organization, Ministry of Health, IR of Iran and United Nations International Drug Control Program.
14. Chaouloff, F. 1994. Influence of physical exercise on 5-HT1A receptor and anxiety-related behaviours. *Neuroscience letters*, 176(2), 226-230.
15. Donath, L., Boettger, S., Puta, C., Wetzig, F., Mueller, H.J., Bär, K.-J., Gabriel, H.H. 2010. Dissociation of performance parameters at the IAT requires specific exercise recommendations for depressed patients. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 34(1), 131-135.
16. Mirahmadizadeh, A., Kadivar, M., Hemmati, A., Javadi, A. 2004. Infection with HIV and hepatitis C and B viruses among injecting drug users in Shiraz, Southern Iran. International Conference on AIDS. pp. 16.
17. Alghamdi, A.S., Sanai, F.M., Ismail, M., Alghamdi, H., Alswat, K., Alqutub, A., Altraif, I., Shah, H., Alfaleh, F.Z. 2012. SASLT practice guidelines: management of hepatitis C virus infection. Saudi journal of gastroenterology: official *Journal of the Saudi Gastroenterology Association*, 18(Suppl 1), S1-32.
18. Greidanus, N.V., Masri, B.A., Garbuz, D.S., Wilson, S.D., McAlinden, M.G., Xu, M., Duncan, C.P. 2007. Use of erythrocyte sedimentation rate and C-reactive protein level to diagnose infection before revision total knee arthroplasty. *The Journal of Bone & Joint Surgery*, 89(7), 1409-1416.
19. Richter, K. 1987. Clinical significance of the erythrocyte sedimentation rate in orthopaedic surgery. *The Journal of Bone & Joint Surgery*, 69(5), 794-794.
20. Dufour, D.R., Lott, J.A., Nolte, F.S., Gretch, D.R., Koff, R.S., Seeff, L.B. 2000. Diagnosis and monitoring of hepatic injury. I. Performance characteristics of laboratory tests. *Clinical chemistry*, 46(12), 2027-2049.
21. Baranova, A., Lal, P., Biredinc, A., Younossi, Z.M. 2011. Non-invasive markers for hepatic fibrosis. *BMC gastroenterology*, 11(1), 91.
22. This, N. 2002. National Institutes of Health consensus development conference statement: management of hepatitis C: 2002-June 10-12, 2002. Management, 2002.
23. Minemura, M., Tajiri, K., Shimizu, Y. 2009. Systemic abnormalities in liver disease. *World journal of gastroenterology*: WJG, 15(24), 2960.

24. Hsieh, P.-S., Hsieh, Y.-J. 2011 .Impact of liver diseases on the development of type 2 diabetes mellitus. *World Journal of gastroenterology: WJG*, 17(48), 5240.
25. Mehta, S.H., Brancati, F.L., Sulkowski, M.S., Strathdee, S.A., Szklo, M., Thomas, D.L. 2001. Prevalence of type 2 diabetes mellitus among persons with hepatitis C virus infection in the United States. *Hepatology*, 33(6), 1554-1554.
26. Qureshi, H., Mehdi, I., Ahined, W., Alam, S ,.Ahsan, T., Mujeeb, S., Jawad, F. 2002. Diabetes mellitus is equally frequent in chronic HCV and HBV infection. Diabetes.
27. Hepner, G.W., Chopra, I.J. 1979. Serum thyroid hormone levels in patients with liver disease. *Archives of internal medicine*, 139(10), 1117-1120.
28. Jadali, Z. 2013. Autoimmune thyroid disorders in hepatitis C virus infection: Effect of interferon therapy. *Indian Journal of endocrinology and metabolism*, 17(1), 69.
29. Mao, X.R., Zhang, L.T., Chen, H., Xiao, P., Zhang, Y.C. 2014. Possible factors affecting thyroid dysfunction in hepatitis C virus-infected untreated patients. *Experimental and therapeutic medicine*, 8(1), 133-14.0
