Journal of Pharmaceutical Research International

33(8): 23-27, 2021; Article no.JPRI.64974
ISSN: 2456-9119
(Past name: British Journal of Pharmaceutical Research, Past ISSN: 2231-2919, NLM ID: 101631759)

Alteration of Serum Liver Enzymes Level Caused by Cetirizine Hydrochloride in Exercise Performers

Manzoor Khan[1], Alamgir Khan[2*], Muhammad Zafar Iqbal Butt[2], Samiullah Khan[3], Ejaz Asghar[4] and Muhammad Jamil[5]

[1]Department of Sports Sciences and Physical Education, Gomal University, Dera Ismail Khan, KPK, Pakistan.
[2]Department of Sports Sciences and Physical Education, University of the Punjab Lahore, Pakistan.
[3]Gomal Center of Biochemistry and Biotechnology, Gomal University, Dera Ismail Khan, KPK, Pakistan.
[4]Department of Sports Sciences and Physical Education, ISRA University Islamabad Pakistan.
[5]Punjab High Police Lahore, Pakistan.

Authors' contribution

This work was carried out in collaboration among all authors. Authors MK and AK conceived of the study, developed the research design, completed data collection, performed statistical analyses, Authors SK, MZIB and EA contributed to the literature review and the interpretation of the results, and drafted the manuscript. Author MJ contributed to the interpretation of the results, and helped in drafting the manuscript. All authors have read and approved the final version of the manuscript and agreed with the order of presentation of the authors.

Article Information

DOI: 10.9734/JPRI/2021/v33i831210
Editor(s):
(1) Dr. Prabakaran Nagarajan, The Ohio State University, USA.
Reviewers:
(1) Hind Hadi Abdullah, University of Baghdad, Iraq.
(2) Ashwani Mishra, Barkatullah University, India.
Complete Peer review History: http://www.sdiarticle4.com/review-history/64974

Original Research Article

Received 22 November 2020
Accepted 28 January 2021
Published 08 March 2021

ABSTRACT

Background: Players regularly use cetirizine HCL for the prevention and treatment of various symptoms of allergy while playing in unfamiliar environments.
Objective: This research study was carried out to examine the effect of cetirizine HCL on liver function (ALT, ALP and AST) among the players.
Methods: A descriptive study was carried out at Gomal University, Dera Ismail Khan from January 2019 to June 2019.Twenty male subjects 10 players using cetirizine HCL (one tablet of 10mg/day)

**Corresponding author: E-mail: alamgir1989@hotmail.com;*

as experimental group and 10 players not using cetirizine HCL as control group was selected voluntarily as participants of the study. Five ml blood was taken from all subjects after three hours of administration of cetirizine HCL for the assessment of ALT, ALP and AST. The results obtained through liver functions test (LFTs) were analyzed through a statistical package for social sciences (SPSS, Version 24).

Results: Significant difference was found in both groups (CG and EXG) in term of ALT (P = 000, 0.05>.000). There was significant difference between in both groups (CG and EXG) in term of ALP (P = 000, 0.05>.000). A significant difference was found between in both groups (CG and EXG) in term of AST (P = .001, 0.05>.000).

Conclusion: on the basis of finding, the researcher concluded that Cetirizine HCL (Tablet 10mg) produced a significant rise in liver enzymes and hence disturbing the normal functioning of liver.

Keywords: Cetirizine HCL; Liver; ALT; ALP; AST.

1. INTRODUCTION

Athletes generally use cetirizine HCL (Tablet 10mg) for allergic disorders caused by daily unusual responses to various kind of microorganisms. Senior as well as athletes with liver problem, the segregation of this cholinergic, non-sedating, second-generation histamine-1 receptor-blocking agent is found slow [1].

Basically elimination of cetirizine HCL take place in the kidney but to some extent it's undertaken in the metabolic process of liver enzymes. Liver and kidney disorders may cause raise in risk factors of cetirizine HCL [2].To circumvent the risk factors, it is important to use it in a prescribed dose [3]. In addition cetirizine cause an increase in the level of ALT, chances of hepatitis and other problems concerned with kidney [4]. Athletes use cetirizine HCL for gaining relief from various symptoms of allergy such as runny nose, watery eyes, sneezing and itching etc. This chemical substance works by blocking a different natural substance which formed by the body during allergic reaction [5].

Use of cetirizine HCL and other hepatotoxic drugs adversely affect the liver enzymes and cause various kinds of health complications. Therefore patients with liver and other health problems may be advised to avoid the use of cetirizine HCL and other particular types of medicines [6, 7]. It is indicated by the various research studies that all types of liver enzymes particularly CGT was found change among the cetirizine users. In other hand these enzymes were found in normal range after taking off cetirizine HCL and other masking agents [8, 9].

Regular use of ant allergic is one among the causative agent of liver damage and various kind health complications including kidney problem, lungs and so on. For avoiding the negative effects of ant allergic, it is important to use all types of anti- allergic according to the age, gender and prescription of medical experts. High level of liver enzymes HCL and the development of hepatitis have been considered as associated risk factors of cetirizine HCL [10].

2. MATERIALS AND METHODS

2.1 Research Design

As this research study was concerned with the effects of Cetirizine HCL on liver enzymes among the players. Therefore "experimental post-test only design" for representing the study in a reasonable and logical manner was employed.

2.2 Participants of the Study

Two groups of subjects (male players using cetirizine HCL (Tablet 10mg) and non-user of cetirizine HCL (tablets 10mg) recruited from Gomal University and thus randomly divided into two groups i.e. player using cetirizine HCL (Tablet 10mg) as an experimental group (EXG) and players not using cetirizine HCL (Tablet 10mg) as a control group (CG). Each group was comprised of ten subjects. Medical as well as playing history of subjects was also reviewed while taking blood samples from the subjects. Male Subjects aged 20 to 30 years, using cetirizine HCL (one tablet/day with a glass of water just after taking the meal) from minimum duration of 6months and maximum duration of 1 year, having no liver and kidney problems and also participating at university level sports competitions were included in the study.

2.3 Blood Sample Collection

Five milliliters of blood sample was collected from each subject after three hours of administration of cetirizine HCL. After collection

of sample, the blood sample was kept in tubes containing EDTA as anticoagulant and was sent to the laboratory immediately for performing the ALT, ALP and AST tests.

2.4 Measurements of ALT, AST and ALP Levels

Schumann et al., method was used for measurement of Alanine transaminase (ALT) and Aspartate aminotransferase (AST) was performed according to [11]. Schumann et al., standard procedure was employed for the determination of alkaline phosphatase [12].

2.5 Analysis of Data

The collected data were expressed by using mean and standard deviation and t-test through statistical package for social sciences (version 24.0). Mean was used for the determination of mean average of data obtained through LFTs and T-test was used for the diagnosing the difference in both groups in term of ALT, ALP and AST.

3. RESULTS

Description of data of both groups (CG and EXG) in term of ALT, ALP, and AST has been presented in Table 1. Similarly the data are articulated as mean and standard deviation etc. The data of both groups about ALT showed as mean (29.35±3.11659), Max rang 25.00 and Max rang 35.00, Variance 9.713. ALP showed mean and ±SD (141.2500 ± 14.50181), Min rang 111.00, Max rang 40.00 and variance was 210.302. AST showed mean and ±SD as 33.6000 ± 4.87097, Min rang 22.00, Max rang 40.00, and variance was 23.726.

Data were expressed by using mean, standard deviation and t value. Mean and standard deviation of CG in term of ALT was 26.60±1.50, T value 81.75 whereas mean and standard deviation of EXG in term of ALT was 32.10±3.11, T value 81.75 and P value of both groups was 000. Mean and standard deviation of CG was found less than mean and standard deviation of EXG, therefore a significance difference was found in both CG and EXG (Table 2).

Data were expressed by using mean, standard deviation and t value. Mean and standard deviation of CG in term of ALP was 129.90±10.31, T value 32.67. Mean and standard deviation of EXG in term of ALP was 141.25±14.50, T value 32.67 and P value of both groups was 000. Mean and standard deviation of CG was found less than mean and standard deviation of EXG, therefore significance difference was found in both CG and EXG in term of ALP (Table 3).

Data were expressed by using mean, standard deviation and t value. Mean and standard deviation of CG in term of AST was 30.30±4.39, T value 16.82. Mean and standard deviation of EXG in term of ALP was 33.605±4.87, T value 16.87 and P value of both groups was 0.001. Mean and standard deviation of CG was found less than mean and standard deviation of EXG, therefore significant difference was found between CG and EXG in term of AST (Table 4).

4. DISCUSSION

The present study indicated that significant difference was found between CG and EXG in term of ALT (P = 000, 0.05>.000). Mean and standard deviation of CG was found less than mean and standard deviation of EXG in term of ALT. A study conducted by [11, 13] indicated that frequent usage of cetirizine caused dramatic increase in alanine aminotransferase (ALT). In addition the findings of the study conducted by [8, 14, 15] revealed that hepatitis and cholestasis is also linked with cetirizine HCL and other anti-allergic substance [8, 14, 15].

Findings of the study revealed that a significant difference was found between CG and EXG term of ALP (P = 000, 0.05>.000). Mean and standard deviation of CG was found less than mean and standard deviation of EXG in term of ALP. This emerging finding is supported by [6,16] which indicated that serious liver problems particularly in ALT,ALP and AST was found in 9 years old girls using cetirizine HCL(tablets 10mg). In addition the author also observed that along with liver problems other associated problems such abdominal pain and episodes of nausea and vomiting were observed among the user of this medicine.

The study showed that a significant difference was found between CG and EXG in term of AST (P = 000, 0.05>.000). Mean and standard deviation of CG was found less than mean and standard deviation of EXG in term AST. The

study conducted by [16] found out that AST and ALT levels were elevated up to 7.24 pkat/L and 14.4 pkat/L among the user of cetirizine HCL (tablets 10 mg). It is further stated by the author that the problem was found among subjects even after discontinuing the cetirizine HCL.

Table 1. Descriptive analysis of subjects in term of ALT, ALP and AST

	N	Minimum	Maximum	Mean	Std. deviation	Variance
ALT	20	25.00	35.00	29.3500	3.11659	9.713
ALP	20	111.00	161.00	141.2500	14.50181	210.303
AST	20	22.00	40.00	33.6000	4.87097	23.726
Valid N (list wise)	20					

Table 2. Comparison of control and experimental group in term of ALT

Testing Groups	N	Mean	SD	T	Sig
CG (ALT)	10	26.6000	1.50555	81.75	.000
EXG (ALT)	10	32.1000	3.11659		
			α=0.05		

Table 3. Comparison of control and experimental in term of ALT

Testing Groups	N	Mean	SD	T	Sig
CG (ALP)	10	129.9000	10.31127	32.67	.000
EXG (ALP)	10	141.2500	14.50181		
			α=0.05		

Table 4. Comparison of control and experimental in term of ALT

Testing Groups	N	Mean	SD	T	Sig
CG (AST)	10	30.3000	4.39823	16.82	.001
EXG (AST)	10	33.6000	4.87097		
			α=0.05		

The study conducted by researchers [16,17] concluded that oxidative stress which is a negative body state was observed among the users of cetirizine HCL (tablets 10mg) and contraceptive pills among the females. It means that female using contraceptive pills for avoiding unwilling pregnancy is also at risk of developing imbalance-ness in both reactive oxygen species (ROS) and antioxidants. For avoiding the harmful effects of any kind of chemical substances and promoting the liver health, one need to do regular exercise including daily walk, jogging and running etc. because these activities strengthen the functional capacity of liver and other body systems.

5. CONCLUSION

On the basis of the findings of the study, researcher concluded that frequent use of cetirizine HCL affects the normal level of ALT, ALP and AST. The results of the current study exhibited that a significant increase was observed in liver enzymes among players using Cetirizine HCL (tablets 10mg) and therefore it is suggested to avoid the frequent use of Cetirizine HCL because it may produce distress in the regular working of the liver.

CONSENT

It is not applicable

ETHICAL APPROVAL

Ethical approval for all the experimental protocols of the study was taken from Ethical and Research Board of Gomal University, Dera Ismail Khan, KPK, Pakistan (Ref No:137/ERB/GU/19).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Horsmans Y, Desager JP, Hulhoven R, Harvengt C. Single-dose pharmacokinetics of cetirizine in patients with chronic liver disease. The Journal of Clinical Pharmacology. 1993;33(10):929-32.
2. Awni WM, Yeh J, Halstenson CE, Opsahl JA, Chung M, Matzke GRE. J Clini. Pharm. 1990;38(1):67-69.
3. Product Information. Zyrtec (cetirizine). Pfizer US Pharmaceuticals, New York,
4. Campoli-Richards DM, Buckley MM, Fitton A Cetirizine. Drugs. 1990;40(5):762-81.
5. Arendt C, Bernheim J. Curr. Thera. Res. Clin. and Exper.1989;46(4):724-734.
6. Colle I, Reynaert H, Naegels S, Hoorens A, Urbain DJ. Hepatology. 1999;30(3): 553.
7. Freneaux E, Larrey D, Berson A, Pessayre D, Benhamou JP Gastro. Clin. et Biolo. 1988;12(6-7):573-575.
8. Bera F, Siproudhis JP, Jonville-Bera AP, Martin MP, Autret E Gastro. Clin. et Biolo. 1999;17(10):770.
9. Pompili M, Basso M, Grieco A, Vecchio FM, Gasbarrini G, Rapaccini GL. Recurrent acute hepatitis associated with use of cetirizine. Annals of Pharmacotherapy. 2004;38(11):1844-7.
10. Jensen RT, Norton JA, Oberg KFM, Friedman LS, Brandt LJ. Sleisenger and Fordtran's Gastrointestinal and Liver Diseases. 2016;30(3):553.
11. Lever LR, Hill S, Marks R, Rosenberg R, Thompson D. Skin Pharm. and Physio. 1992;5(1):29-33.
12. Bera F, Siproudhis JP, Jonville-Bera AP, Martin MP, Autret E Gastro. Clin. et Biolo. 1993;17(10):770.
13. Jurawan R, Smith A. Severe hepatitis in a primary sclerosing cholangitis patient receiving recent cetirizine therapy. The New Zealand Medical Journal (Online). 2010;123(1309).
14. Ekiz Fuat, Ilhami Yüksel, Özlem Ekiz, Sahin Coban, Ömer Basar, Osman Yüksel.Annal. Hepatology. 2016;10(2):237-238.
15. Coskun A, Yavasoglu I, Yasa MH, Culhaci N, Yukselen V. Cetirizine-induced hepatotoxicity: case series and review of the literature. Gastroenterology report. 2018;6(3):228-30.
16. Aftab. Comparative analysis of liver function and oxidative stress associated with oral contraceptive pill. M. Phil. thesis submitted to Gomal University KPK, D. I. Khan KPK. Pakistan; 2017.
17. Khan A, Khan S, Sami K, Khan S. Int. J. Med. Res. & Health Sci. 2019;8(6):75-79.

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle4.com/review-history/64974