World Journal of Clinical Pharmacology, Microbiology and Toxicology
World J. Clin. Pharmacol. Micrbiol. Toxicol Vol 2 [1] January 2016: 10-12
Online ISSN 2454-1729
Journal's URL: http://wjcpmt.com
Impact factor [JIF] : 1.05
Global Impact Factor: 0.384

ORIGINAL ARTICLE

Effect of Diuretic Drug Indapamide on Renal Lipid Profile in Albino rats, *Rattus norvegicus*

Manish Kumar and Singh, P.K.
Department of Zoology, School of Life Sciences, Khandari Campus
Dr. B.R.Ambedkar University, Agra-282002 (India)

ABSTRACT

Indapamide is a thiazide related sulfonamide antihypertensive diuretic drug. In the present study, Each dose of indapamide was given to experimental group of rats at 2.5 mg/Kg body weight daily for 7, 14 and 21 days. Total lipid, total cholesterol (TC), HDL, and LDL increased significantly after 7,14 and 21 days of drug treatment in the kidney of albino rats. However, decreased the triglyceride and VLDL in the kidney. The data were indicated that the adverse side effect of indapamide drug on the lipid metabolism and change in lipid and lipoprotein metabolism.

Key word : *Indapamide, Kidney, Lipid , TC, HDL,LDL.*

CITATION OF THIS ARTICLE

M Kumar and Singh, P.K. Effect of Diuretic Drug Indapamide on Renal Lipid Profile in Albino rats, *Rattus norvegicus. World J. Clin. Pharmacol. Microbiol.Toxicol. Vol 2 [1] January 2016: 10-12*

INTRODUCTION

Diuretic drugs act on the kidney to promote the excretion of water and electrolytes particularly sodium (Na^+). It is widely used in treating cardiovascular diseases such as hypertension. Indapamide is a thiazide related sulfonamide antihypertensive diuretic drug. It is a lipophilic agent and concentrated in the R.B.Cs and is bounded plasma proteins (1). Indapamide produces some side effects such as hypercalcemia, hyperlipidemia etc. Increased years it has become evident that several of the drug used for standard antihypertesive therapy may interact with lipoprotein metabolism (2). The lipid and lipoproteins play a central role in the metabolism of body and have become increase important clinical aspects primarily because of their association with coronary heart disease (CHD)(3). Keeping this idea in background, the present study was taken to estimated the adverse side effects of indapamide drug compound on the renal lipid profile in albino rat.

MATERIALS AND METHODS

Experimental animal:

Thirty healthy albino rats of both sex almost equal size and weight (79±20) were procured from JALMA Reaserch Centre, Agra and were acclimatized in good laboratory conditions. The animals were housed in polypropylene cages, maintained at controlled temperature (27± 0.5°C) and light cycle (12hr light and 12hr dark). They were fed with Goldmohar brand animal feed manufactured by Lipton India Ltd. Food and water were provided *ad libtum*.

Selection of dose:

Animals were administered with indapamide (Trade name-Lorvas, manufactured by Tornett Pharmaceutical Pvt. Ltd. Indrad, Gujarat) at 2.5mg/kg body weight with normal saline orally through cathedral tube daily for 7,14 and 21 days (4).

Experimental Procedure:

Body weights of animals were recorded and then they were divided into six groups of five rats each.The albino rats were fasted overnight before sacrificed after the treatment of indapamide on 7^{th}, 14^{th} and 21^{st} days. Kidney was dissected out blotted of blood, rinsed in the phosphate buffer saline (pH 7.4). 250 mg sample (kidney) was homogenized with 5.0 ml glacial acetic acid for total cholesterol and high density lipoprotein .For other biochemical parameters samples were homogenized in 5.0 ml deionized water. The

homogenates were centrifuged at 5000 rpm at room temperature for 30 minutes and the supernatant was used for analysis.

Biochemical Estimations:

The total lipid in kidney was estimated by the method of (5); consisted in homogenizing the tissue with a 2:1 chloroform methanol mixture; total cholesterol by (6) triglyceride by (7) HDL by the method of (8) using kit from Span diagnostic Ltd. India. VLDL was calculated by dividing TG values with five and LDL calculated by subtracting VLDL +HDL values from cholesterol by (9).

Statistical analysis:

All the data were statistically evaluated and the significance calculated using student't' test. All the result was expressed as mean ± S.EM. The calculated value was signified by (10).

RESULTS

The total lipid, TC, HDL and LDL contents in the kidney were increased significantly after 7, 14 and 21 days of indapamide drug treatment as compared of control rats. Whereas, significant decrease in TG and VLDL levels were evident (Table-1).

Table-1: Changes in lipid profile of Kidney after Indapamide drug treatment

Parameter	No. of albino rats	Treatment period	Control	Treated
			Mean±S.E.M.	Mean±S.E.M.
Total lipid (mg/gm)	5	7	50 ± 0.70	55.8 ± 0.066**
		14	53.8± 1.85	61.4 ± 1.536**
		21	58 ± 1.41	80 ± 2.53***
Total Cholesterol (mg/gm)	5	7	0.047± 0.002	0.006± 0.004**
		14	0.056± 0.001	0.090± 0.006***
		21	0.056±0.003	0.120± 0.005***
HDL (mg/gm)	5	7	0.005± 0.0005	0.008± 0.0008**
		14	0.006± 0.003	0.014± 0.0007***
		21	0.006± 0.0005	0.020± 0.0007***
LDL (mg/gm)	5	7	0.022± 0.0026	0.040± 0.004***
		14	0.035± 0.0012	0.063± 0.006***
		21	0.036± 0.0028	0.090± 0.006***
TG (mg/gm)	5	7	0.108± 0.004	0.078± 0.005*
		14	0.078± 0.008	0.062± 0.003**
		21	0.066± 0.004	0.043± 0.002***
VLDL (mg/gm)	5	7	0.016± 0.0009	0.014± 0.0006**
		14	0.015± 0.0007	0.012± 0.0007**
		21	0.013± 0.0008	0.008± 0.0003***

± S.E.M. = Standard Error of Mean

*** = Very Highly Significant (p<0.001)

** = Highly Significant (p<0.01)

* = Significant (p<0.05)

DISCUSSION

In the present study, we observed an increase in total lipid and cholesterol level in the kidney may be due to the side effects of indapamide drug treatment. Lipid and lipoproteins abnormalities play a significant role in the development and progression of various pathological diseases (11 and 12). Similar findings have also been observed by (12,13,14 and 15) in humen due to side effects of antihypertensive drugs on the lipid and glucose metabolism. In the present study, we observed an increase the HDL and LDL in the kidney due to the side effects of indapamide drug treatment and can also be correlated with an increase total cholesterol and lipid in the kidney. Similar findings have also been supported by (15,16,and 17) in humen and rats respectively due to the side effects of diuretics. However, we observed a decrease in triglyceride and VLDL contents in the kidney may be due to the side effects of indapamide drug treatment. Similar observations have also been supported by (13,18,19,and 20) in humen due to diuretic drug therapy on the lipoprotein metabolism.

Finally, it is important to note that observations on interaction of diuretic agent with lipid profile have so far been limited to metabolism. Still, at this stage is of clinical interest that several of the generally available diuretic drugs seem to be metabolically neutral with regard to the lipid profile and may also be useful in planning therapeutic regimens for treating hypertensive patients.

REFERENCES

1. Cambell, D.B. and Philip, E.M.(1974) Short term effects and urinary excretion of the new diuretic, indapamide in normal subjects. Eur.J Clin. Pharmacol.;**7**: 407.
2. Spence J.D., Huff, M., and Barnett, P.A.(2000) Effect of indapamide versus hydrochlorothiazide on plasma lipids and lipoproteins in hypertensive patients : a direct comparison. Can.J. Clin. Pharmacol; **7**(1) : 32-37.
3. McNamera, J.R., Warnick, G.R. and Wu, L.L., (2000) Lipid and lipoprotein. Clin. Biochem. **11:** 232-259.
4. Campbell, D.B. and Moore, R.A.(1981) The Pharmacology and clinical pharmacology of indapamide. Postgard. Med. J; **57** (Supp.2): 120 –125.
5. Folch, J., Lers, M. and Stanlty, G.H.S(1957) A simple method for the isolation and purification of total lipids from animal tissue. J.Bio.Chem. **226**, 497-506
6. Zlatkis, A., Zak, B.B. and Boyle, G.I.B. (1953) A colorimetric method for determination of cholesterol. J.Lab.Clin. Med. **41**, 489-496.
7. Mc Gowan(1983) Estimation of triglyceride. Clin. Chem.; **29**, 538-539.
8. Warnick, G.R., Nguyen, T. and Albers, A.A. (1985). Comparison of improved precipitation methods for quantification of high density lipoprotein cholesterol. Clin. Chem.; **31**: 217-224
9. Friedwald, W., Levy, R.I. and Fredrickson, O.S.(1972) Estimation of the concentration of law density lipoprotein cholesterol in plasma without of preparative ultra centrifuge. Clin. Chem. **18**: 499-515.
10. Fisher, R.A. and Yates, Y. (1963) Statistical tables for biological agriculture and medical research, Sixth Ed. Hing Yip Printing Co. Hong Cong : 146.
11. Mamedov, M.N., Perova, N.V., Kosmatova, O.V. Khadipash, L.A, Kiseleva, N.V., and Oganov, R.G.(2003) Effect of combined antihypertensive and lipid lowering therapy on the level of coronary risk and tissue insulin resistance in patient with metabolic syndrome.Kardiologii; **43** :13-19
12. Samuelssen, O., Mulec, H. and Givson, C.K. (1997) Lipoprotein abnormalities are associated with increased rate of progression of human renal insufficiency. Nephrol. Transpl.;**12**:1908-1915.
13. Ames, R.P.(1986) The effects of antihypertensive drug on serum lipids and lipoproteins. Drugs. **32**:260-278.
14. Gluck, Z. Baumgartner, G and Weidmann, P. (1978) increased ratio between serum α and β-lipoprotein during diuretic therapy. Clin. Sci. Med.; **5**:325-328.
15. Krone, W. and Nagele, H. (1988) Effects of antihypertensives on plasma lipid and lipoprotein metabolism. Am. Heart J.**116**, 1729-1734.
16. Inaba, M. Noguchi, Y., Yamamoto, T., Imaim T, Hatno, M., Yogi S. and Katayama, S. (2004) Effects of a low dose of indapamide a diuretic given daily or every other day on blood pressure and metabolic parameters. Hypertens. Res., **27**(3): 141-145.
17. Aubert, I., Djian, F. and Routffy, J. (1990) Beneficial effects of Indapamide on lipoproteins and apoproteins in ambulatory hypertensive patients. Am. J.; **65**(17) : 77H-80H.
18. Middeki, M., Richter, W.O., Schwagndt, P. and Holzgeve, H. (1997) the effect of antihypertensive combination therapy on lipid and glucose metabolism, hydrochlorothiazide plus captopril. J. Clin. Pharmacol. Ther., **35**(6): 231-234.
19. Ames, R.P. and peacock, P. (1984) serum cholesterol during treatment of hypertension with diuretic drugs. Arc. Int. Med.; **144:**710-714
20. Weidmann, P., Gerber, A. and Mordasini, R. (1983) Effect of antihypertensive therapy on lipoproteins. Lipoproteins. Hypertension (Suppl- III); **32** : 120-31.

CONFLICT OF INTEREST	: Nil
Received	: 11.12.2015
Accepted	: 19.01.2016