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CODEN: IAASCA **ORIGINAL ARTICLE**

Effect of Diuretic Drug Furosemide on Kindney Lipid Profile in Abino rats, *Rattus norvegicus*

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ABSTRACT
In the present study, Each dose of Furosemide 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 Furosemide drug on the lipid metabolism and change in lipid and lipoprotein metabolism.
Key word : Furosemide, Renal Lipid profile
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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. Furosemide is a loop diuretic (water pill) that prevents your body from absorbing too much salt, allowing the salt to instead be passed in your urine. Furosemide is used to treat excessive accumulation of fluid and/or swelling of the body caused by heart failure, cirrhosis, chronic kidney failure, and the nephrotic syndrome. It is sometimes used alone or in conjunction with other blood pressure pills to treat high blood pressure. It also is used for treating high levels of potassium (hyperkalemia), calcium (hypercalcemia), and magnesium (hypermagnesemia). Increased years it has become evident that several of the drugs used for standard antihypertesive therapy may interact with lipoprotein metabolism. 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)[2]. Keeping this idea in background, the present study was taken to estimate the adverse side effects of Furosemide 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± 0.5^0C) and light cycle (12hr light and 12hr dark). They were fed with Goldmohar brand animal feed manufactured by Lipton India Ltd. Food and water was provided *ad libtum*.

Selection of dose:

Animals were administered with Furosemide (Trade name-Laxis, 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 [3].

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 Furosemide 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 [4]; consisted in homogenizing the tissue with a 2:1 chloroform methanol mixture; total cholesterol by [5] triglyceride by [6] HDL by the method of [7]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 [8].

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 [9].

RESULTS

Table 1 showed the total lipid, TC, HDL and LDL contents in the kidney were increased significantly after 7, 14 and 21 days of Furosemide drug treatment as compared of control rats. Where as, significant decrease in TG and VLDL levels.

Table-1: Changes in lipid profile of Kidney after Furosemide 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**	48 ± 0.72	51.8 ± 0.076**
		14	51.8± 1.81	57.4 ± 1.506**
		21	57 ± 1.40	70 ± 2.33***
Total Cholesterol (mg/gm)	5	**7**	0.039± 0.002	0.005± 0.001**
		14	0.053± 0.001	0.078± 0.003***
		21	0.054±0.003	0.101± 0.007***
HDL (mg/gm)	5	**7**	0.005± 0.0005	0.007± 0.0004**
		14	0.007± 0.003	0.011± 0.0007***
		21	0.007± 0.0005	0.019± 0.0003***
LDL (mg/gm)	5	**7**	0.026± 0.0026	0.037± 0.001***
		14	0.031± 0.0012	0.060± 0.003***
		21	0.032± 0.0028	0.089± 0.005***
TG (mg/gm)	5	**7**	0.102± 0.004	0.072± 0.001*
		14	0.073± 0.008	0.061± 0.003**
		21	0.066± 0.004	0.040± 0.002***
VLDL (mg/gm)	5	**7**	0.013± 0.0009	0.08± 0.0006**
		14	0.011± 0.0007	0.011± 0.0002**
		21	0.014± 0.0008	0.007± 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 work, we studies an increase in total lipid and cholesterol level in the kidney may be due to the side effects of Furosemide drug treatment. Lipid and lipoproteins abnormalities play a significant role in the development and progression of various pathological diseases [10,11]. Similar findings have also been observed by [12-15] in human due to side effects of antihypertensive drugs on the lipid and glucose metabolism. In the present work, we observed an increase the HDL and LDL in the kidney due to the side effects of Furosemide drug treatment and can also be correlated with an increase total cholesterol and lipid in the kidney [15,16]. However, we observed a decrease in triglyceride and VLDL contents in the kidney may be due to the side effects of Furosemide drug treatment. Similar observations have also been supported by [13,14, 16] 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.

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