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Impact of Cialis on Haemoglobin Concentration and Lipid Profile of Wistar Male Rats

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Abstract

Erectile dysfunction (ED) is the consistent or recurrent inability of a man to attain and/or maintain a penile erection enough for sexual activity, currently phosphodiesterase (PDE) inhibitors are used in the treatment of erectile dysfunction. This research work is set out to determine the lipid profile and haemoglobin concentration of wistar male rats administered with cialis, forty-five male albino wistar rats with an average weight of 100 g were used for the study. Cholesterol, high density lipoprotein (HDL), low density lipoprotein (LDL) and triglycerides concentration increased non-significantly at the 7th, 14th and 21st day following treatment, haemoglobin concentration also increased but its increase was significant as compared to the control animals. The elevated lipid profile with corresponding increase in hematocrit is as a result of reverse cholesterol transport mechanism. However due to the observed effect of the drug on lipid profile, utilization of the drug should be monitored as elevated lipid profile could pose as a risk factor for the development of other diseases.

Keywords: Haemoglobin; Male Rats; Lipid; phentolamine; Triglycerides

Introduction

Drugs such as trazadone, phentolamine, yohimbie etc. and diverse therapeutic method such as urethral suppositories and penile prosthetic surgery has been used in the past decades for the management of erectile dysfunction [1]. These therapeutic methods were stopped because of their invasive, dangerous and hostile nature associated with the therapy procedures, likewise the drugs for their ineffectiveness [2]. Erectile dysfunction (ED) as defined by Sinha [3] is "the consistent or recurrent inability of a man to attain and/or maintain a penile erection sufficient for sexual activity", currently phosphodiesterase (PDE) inhibitors are used in the treatment of erectile dysfunction.

Erection working normally involves combined effort of nervous, hormonal and vascular systems. Disorders of the nervous and hormonal systems contribute to erectile dysfunction which is caused primarily by diseases and improper functioning of the vascular system. Erectile dysfunction is grouped based on the cause of erectile dysfunction into organic and psychogenic causes, PDE inhibitors are used in the management of erectile dysfunctioning associated with organic (physical) causes [3]. Erection is achieved primarily through nitric oxide (NO) and other neurotransmitters releases due to sexual stimulation; pathways involving cavernous and pudendal nerves, supraspinal structures including the medial preoptic area and paraventricular nucleus of the hypothalamus [4].

Nitric oxide synthase from the cavernous (autonomic) nerves synthesizes nitric oxide which initiates erection and the erection is sustained during sexual stimulation by nitric oxide synthase of the endothelium [5]. Crossing the cell membrane through passive diffusion NO activates guanylyl cyclase (sGC) which acts on guanosine triphosphate (GTP) converting it to cyclic guanosine monophosphate (cGMP), protein kinase G is activated due to amplified amount of cGMP. Protein kinase G phosphorylates ion channels leading to potassium channel opening and closing of calcium channel, the reduction in calcium concentration in the cytosol promotes the relaxation of the muscle [6]. Phosphodiesterase (PDE) inactivates cyclic guanosine monophosphate; PDE-5 inhibitors prevent the catabolism of cyclic GMP [7].

Currently, there are four available registered PDE-5 inhibitors they are sildenafl, vardenafl, tadalafl and avanafl, tadalafil trade name cialis is more of the most potent PDE-5 inhibitors, its action is competitive and reversible. Lipid plays important structural and membrane role in the body, irrespective of these beneficial roles accumulation or elevated amount of blood cholesterol, low density lipoprotein (LDL) is detrimental to health, thus it is vital that blood cholesterol level, LDL and other parameters associated with lipids be monitored especially when consuming other medications. Haemoglobin is responsible for the transport

of oxygen in erythrocytes and contains iron, its decrease with or without an absolute decrease in red blood cells leads to anaemia. It is in this perceptive that this research work is set out to determine the lipid profile and haemoglobin concentration of wistar rats administered with Cialis.

Materials and Methods

Drugs and Chemicals

Cialis manufactured by Lilly pharmaceutical company Indonesia was purchased from a local pharmacy in Choba, Rivers state Nigeria. The chloroform used as anesthetic for the animals was manufactured by Shiv Shakti Trading corporation india, all other reagents used were also of analytical grade and the randox kit used were obtained from Randox chemical Laboratory (Crumlin, UK).

Experimental Animals

Forty-five male albino wistar rats with an average weight of 100 g obtained from animal house in the Department of Biochemistry University of Port Harcourt Nigeria were used for the research, following acclimatization the animals were grouped into five groups each containing nine rats; one group served as the control while the remaining four groups were administered 0.15 mg/100 g body weight, 0.35 mg/100 g body weight, 0.55 mg/100 g body weight and 0.75 mg/100 g body weight for a duration of 21 days. At the end of each week (7th, 14th and 21st) three (3) rats from each group was sacrificed and analysed.

Collection of Blood

Anesthesia (chloroform) was used to immobilize the animals after which blood samples for the various groups were collected into lithium heparin bottles, centrifuged for five minutes and stored for further analysis.

Estimation of Lipid Profile and Haemoglobin Conentration

Cholesterol, triglycerides and HDL (high density lipoprotein) were assayed on the principle that enzymatic hydrolysis and oxidation yields a colored product which can be quantified, randox test kit as used by Nzor, Onuoha, Samuel, Okari and Archibong [8] in the determination of lipid profile were also used to test for cholesterol, triglycerides and HDL. While LDL (low density lipoprotein) concentration was obtained using friedwald's formular [9] and haemoglobin concentration was estimated using direct cyanmethaemoglobin methods [10].

Analysis of Result

Results obtained from analysis were subjected to statistical analysis using IBM SPSS 23 (IBM Inc., Armonk, NY, USA). The data obtained from statistical analysis are represented as mean values plus or minus standard deviation, at 95 % confidence level ($P < 0.05$) the statistical values were considered significant (Tables 1-5).

Table 1: Effect of Cialis on haemoglobin concentration of wistar rats. Alphabet a stand for significant difference between the control groups and test group.

Drug concentration mg/L	Haemoglobin Concentration (g/dL)		
	7th day	14th day	21st day
0.000	8.20 ± 0.05	8.36 ± 0.18	8.04 ± 0.05
0.15	11.66 ± 0.43^{a}	9.3 ± 0.77	9.21 ± 0.15
0.35	12.4 ± 0.26^{a}	12.1 ± 0.82^{a}	10.76 ± 0.17
0.55	13.9 ± 0.11^{a}	13.5 ± 0.31^{a}	12.0 ± 0.23^{a}
0.75	14.0 ± 0.26^{a}	13.5 ± 0.17^{a}	12.3 ± 0.09^{a}

Table 2: Effect of Cialis on Cholesterol concentration of wistar rats.

Drug concentration mg/L	Cholesterol Concentration (mmol/L)		
	7th day	14th day	21st day
0.000	3.80 ± 0.17	3.65 ± 0.10	3.82 ± 0.11
0.15	4.21 ± 0.23^{a}	3.83 ± 0.25	3.76 ± 0.18
0.35	4.34 ± 0.20^{a}	3.72 ± 0.13	3.63 ± 0.11
0.55	4.04 ± 0.22^{a}	3.74 ± 0.19	3.52 ± 0.10
0.75	4.10 ± 0.10^{a}	3.64 ± 0.14	3.54 ± 0.13

Table 3: Effect of Cialis on HDL concentration of wistar rats.

Drug concentration mg/L	HDL concentration (mmol/L)		
	7th day	14th day	21st day
0.000	1.003 ± 0.003	1.003 ± 0.003	1.003 ± 0.009
0.15	1.203 ± 0.009^{a}	1.213 ± 0.003^{a}	1.223 ± 0.009^{a}
0.35	1.373 ± 0.007^{a}	1.320 ± 0.006^{a}	1.327 ± 0.003^{a}
0.55	1.193 ± 0.02^{a}	1.443 ± 0.02^{a}	1.427 ± 0.007^{a}
0.75	1.423 ± 0.009^{a}	1.443 ± 0.015^{a}	1.450 ± 0.010^{a}

Table 4: Effect of Cialis on LDL concentration of *wistar* rats.

Drug concentration mg/L	HDL concentration (mmol/L)		
	7th day	14th day	7th day
0.000	1.00 ± 0.005	1.050 ± 0.069	0.993 ± 0.009
0.15	1.503 ± 0.02^{a}	1.330 ± 0.024	1.02 ± 0.003
0.35	1.873 ± 0.06^{a}	1.009 ± 0.011	1.02 ± 0.001
0.55	1.693 ± 0.02^{a}	1.430 ± 0.047	1.01 ± 0.001
0.75	1.823 ± 0.04^{a}	1.243 ± 0.017	1.00 ± 0.005

Table 5: Effect of Cialis on triglyceride concentration of wistar rats.

Drug concentration mg/L	Triglyceride Concentration (mmol/L)		
	7th day	14th day	21st day
0.000	1.10 ± 0.057	1.26 ± 0.088	1.33 ± 0.089
0.15	1.80 ± 0.076^{a}	1.29 ± 0.057	1.56 ± 0.038
0.35	1.70 ± 0.057^{a}	1.21 ± 0.011	1.34 ± 0.033
0.55	1.70 ± 0.069^{a}	1.13 ± 0.012	1.26 ± 0.061
0.75	1.62 ± 0.058^{a}	1.26 ± 0.066	1.33 ± 0.075

Discussion

From the data obtained in this study, cialis administration increased haemoglobin concentration significantly in a

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dose dependent mode, likewise similar effect of increase in concentration level was observed on the lipid profile with significant increase HDL level. Haemoglobin plays a vital role in the transport of oxygen from the lung to the tissues of the body that requires it and in turn transports carbon dioxide back to the lung for expiration. Reduction in haemoglobin concentration is accompanied by either a decrease or not in red blood cell concentration and could progress to anemia. Cilias is usually consumed by older men. Extremely low haemoglobin concentration is a risk factor for the development of dementia and cognitive impairment especially for older individuals.

Drugs which results to a decrease in haemoglobin concentration would be detrimental to the health specifically when used by advanced persons [11]. Correlation exist between lipid profile and haemoglobin concentration, an individual with reduced haemoglobin concentration would likely also have reduced cholesterol and lipoproteins levels resulting from dilution of the plasma, amplified cholesterol demand due to increased erythropoiesis etc [12,13]. High level of LDL and cholesterol are risk factor for the development of diabetes and atherosclerosis and as such must be monitored and caution taken if a medication would alter their concentration. Lopes, Munhoz, Antonangelo [14] in their study stated that elevated lipid profile with corresponding increase in hematocrit is attributed solely to the mechanism of reverse cholesterol transport. In conclusion Cialis administration on wistar rats increases the haemoglobin concentration significantly and slight alteration of lipid profile in an increasing pattern.

References

1. Schellack, N, Agoro, A (2014) A review of phosphodiesterase type 5 inhibitors. S Afr Fam Pract 56(96): 2.
2. Ferguson, JE, Carson, CC (2013) Phosphodiesterase type 5 inhibitors as a treatment for erectile dysfunction: current information and new horizons. Arab J Urol 11(3): 222-229.
3. Sinha, S (2009) Erectile Dysfunction. CME 39(5): 600–604.
4. Carson, CC, Lue, TF (2005) Phosphodiesterase type 5 inhibitors for erectile dysfunction. BJU Int 96(3): 257–280.
5. Hurt, KJ, Musicki, Palese, MA (2002) Akt-dependent phosphorylation of endothelial nitric-oxide synthase mediates penile erection. Proc Natl Acad Sci U S A 99(6): 4061–4066.
6. Dean, RC, Lue, TF (2005) Physiology of penile erection and pathophysiology of erectile dysfunction. Urol Clin North Am 32(4): 379–395.
7. Coward RM, Carson, CC (2008) Tadalafil in the treatment of erectile dysfunction. Ther Clin Risk Managv 4(6): 1315–1330.
8. Nzor, JN, Onuoha, Okari, Archibong (2018) Effect of Short-Term Administration of Diazepam and Bromazepam on Lipid profile of Albino Wistar Rats (Rattus rattus). Sch. J. App. Med. Sci 6(3): 1187-1191.
9. Friedewald, WT, Levy, RI, Fredrickson (1972) Estimation of the concentration of low-density lipoprotein cholesterol in plasma, without use of the preparative ultracentrifuge. Clinical chemistry 18(6): 499-502.
10. Bansal, Toteja, Bhatia, Gupta, Adhikari, et al. (2016) Comparison of haemoglobin estimates using direct & indirect cyanmethaemoglobin methods. Indian J Med Res 144(4): 566–571.
11. Chaves, PH (2008) Functional outcomes of anemia in older adults. Semin Hematol 45(4): 255–260.
12. Frazer, DM, Anderson, GJ (2003) The orchestration of body iron intake: How and where do enterocytes receive their cues? Blood Cells Mol Dis 30(3): 288-297.
13. Chowta, Reddy, Chowta, Achappa, Madi (2017) Lipid profile in anemia: Is there any correlation? Annals of Tropical Medicine and Public Health 10(4): 837-840.
14. Lopes, GPR, Munhoz, MAG, Antonangelo (2018) Evaluation of relationship between hematocrit and lipid profile in adults. J Bras Patol Med Lab 54(3): 146-152.

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