The Egyptian Journal of Hospital Medicine (2007) Vol., 26: 73 – 83

Effect Of Some Slimming Drugs On Haematological And Some Vital Signs Of Albino Rats

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Abstract

Some of slimming drugs had been withdrawn from markets so, the present study was conducted to follow the effect of three different anorexic drugs; on the haematological and physical parameters of adults albino rats. The used drugs differ in their nature, where the first one i.e., apple-lite is a fully natural substance, the 2nd one i.e., mirapront-N. is a chemical substance and the 3rd one i.e., tenuate is a synthetic foamy filler substance.

Fourty adult male albino rats (130 ± 20g) were randomly divided into four groups, ten on each treated group and ten for the first group which conserved as control group. The 2nd group was treated daily with apple-lite (3.5mg/ 100g.b.wt), the 3rd group was treated daily with mirapro-N (0.14mg/100g.b.wt) and the 4th group was treated daily with tenuate (0.1 mg/100g.b.wt). Haematological parameters (RBCs, WBCs count, haemoglobin content (Hb), hematocrit value (Hct%), mean cell volume (MCV), mean cell heamoglobin (MCH) and mean cell heamoglobin concentration (MCHC) were detected after 30 days of treatment and also after 15 days of the last treatment as a recovery period. Also, body weight, percent of organs weight/body weight, skin-fold thickness and some vital measurements i.e. heart beats, respiratory rate and rectal temperature were recorded after the same periods of treatment and recovery.

Haematological studies revealed that RBCs count, total WBCs count, Hb and Hct values were significantly decreased in the three groups treated daily with anorexic drugs for 30 days. These changes aere also recorded after the recovery period except in apple-lite treated group which showed insignificant change in RBCs and Hb after the recovery period. The calculated mean cell haemoglobin concentration (MCHC) recorded significant increase in apple-lite after treated and recovery periods, while non significant changes in MCHC were observed after mirapro-N and tenuate groups after treatment 30 daysfor 30 days but significant increase of MCHC was recorded after the recovery period of tenuate treated group. Skin-fold thickness of the three regions tested (gluteal, back and belly) revealed significant decrease in all the treated groups except the belly region in apple-lite treated group which showed insignificant decrease after treatment for 30 days. Significant decrease of skin-fold thickness of different regions still present after the recovery period of 15 days in the three treated groups except the back region of mirapro-N and the belly region of apple-lite- treated rats which showed insignificant decrease. Percent of organs weight/body weight were affected according the type of tested drug, while apple-lite- caused non significant changes, mirapro-N caused significant increase in hepatosomatic ratio and cardiosomatic ratio, and significant decrease in gonadosomatic ratio. On the other hand, tenuate resulted in a significant increase in percentage weight of kidneys and hepatosomatic ratio and significant decrease of gonadosomatic ratio after treatment for 30 days. After the recovery period, apple-lite revealed significant decrease in brain/b.wt. ratio, while mirapro-N still affected kidneys, gonadosomatic ratio and brain and tenuate still affected gonadosomatic ratio and brain; they recorded significant decrease. The physical measurement of vital signs, i.e. heart rate, respiratory rate and rectal temperature recorded insignificant change after treatment with apple-lite, mirapro-N and tenuate for 30 days, but significant increase of rectal temperature was recorded in the tenuate group of the treated rats. After recovery period insignificant changes in heart rate, respiratory rate and rectal temperature of the treated rats were observed in the three treated groups.

Key words : Slimming drugs, Haematology, Vital signs, Albino rats.

Introduction

Obesity is increasing at an alarming rate. So, it possesses serious health hazards and its treatment is often disappointing. Crenier and Stensnon (1999) stated that since the withdrawal of the anorectic agents, phentermine and fenfluramine from the worldwide market, orlistat is at this time the only drug approved by the European community for treatment of obesity. Anorexic drugs differ according to the mode of action. Many authors study the safety, evaluation and efficacy of antiobesity drugs of different modes of action (Aronne, 1998; Hvizdos and Markham, 1999; Scheen *et al*., 1999; Lindgarde, 2000; Tones, 2000; Marks 2001; Naumov *et al*., 2002 ; Rodrigues *et al*., 2002). According to Alemany *et al*. (2003) there are three major classes of drugs for the treatment of obesity: (i) inhibitors of food intake, which reduce hunger perception and, consequently food intake, the most representative are centrally acting neurotransmitters and intestinal or neural satiety peptides; (ii) inhibitors of nutrient absorption, which reduce energy disposal through a peripheral gastrointestinal mechanism; and (iii) thermogenic drugs, which increase energy expenditure. The authors added that, at present, there are only two drugs for long-term use; sibutramine, an inhibitor of both serotonin and nor-epinephrin reuptake and orlistat, a lipase inhibitor that targets pancreatic lipases and reduces absorption of dietary fat. According to Hvizdos and Markham (1999), orlistat is a novel non-systemic treatment for obesity, it inhibits lipases in the gastrointestinal tract, preventing the absorption of approximately 30% of dietary fat. Dose of orlistat (120mg) 3 times daily (with each main meal) is optimal. Gokcel *et al*. (2002) concluded that sibutramine, orlistat and metformine were all effective and safe medications that reduce cardiovascular risk and can decrease the risk of type 2 diabetes mellitus in obese female. Overall, treatment with 10mg sibutramine is more effective than orlistat or metformin therapy in terms of weight reduction. Atkinson & Brent (1982) studied appetite suppressant activity in plasma of rats after intestinal bypass surgery. The authors suggested that the intestinal bypass produces a transferable humoral factor that suppresses food intake, so, with a similar mechanism in humans (after intestinal bypass), this humoral appetite-suppressant factor may be clinically useful in the treatment of morbid obesity. Lee *et al*. (1979) found severe hypertension after ingestion of an appetite suppressant (phenylpropanolamine) with endomethacin. The hypertension was attributed to a drug interaction whereby the inhibition of prostaglandin sythesis by indomethacin, exacerbated the sympathom-emetic effects of phenylpropanolamine. Moreover, Genne *et al*. (1994) recorded poisoning after appetite suppressant dexfenfluramine treatment in young adolescent girl. She presented with tachycardia, high blood pressure, mydriasis, fever and behaviour disorders; these signs and symptoms cleared after 48 hours. Glazer (2001) stated that the weight loss attributable to obesity pharmacotherapy in trials lasting 36 to 52 weeks was 7.9 kg for those receiving phentermine resin, 4.3 kg for those receiving sibutramine hydroc-hloride, 3.4 kg for those receiving orlistat and 1.5 kg for those receiving diethylp-ropion hydrochloride "tenuate". Physio-logical, pathological and epidemiological studies strongly support that anorexia induced valvulopathy is attributed to specific serotonergic properties of the fenfluramines.

In recent study, Conductier *et al*. (2005) revealed that 3,4-methylene-N-methanpehetamine (MDMD) or "ecstasy" is a psychoactive substance, first described as an appetite suppressant in humans inducing side effects and even death. We noticed that some slimming drugs were withdrawn from markets. So, we propose to study three different drugs to follow up their action or any side effect of them. In the present study slimming drugs of different sources, natural (apple-fibres and gel) as apple-lite, synthetic-foamy

substance as tenuate and chemically as mirapro-N are used to evaluate their effects on hematological parameters and other measurements in experimental rats.

Material & Methods

Fourty mature albino rats weighing about 130 ± 20g were used in this study. Animals were kept under good ventilation and received a balanced diet and water ad *libitum* throughout the experiment. The animals were then divided into four groups each of 10 amimals. The first group served as control without any treatment, the second, third and fourth groups (10/group) received apple-lite at dose of 3.5 mg/100g, mirapro-N at dose of 0.14 mg/100g and tenuate at dose of 0.1 mg/100g respectively, all doses were calculated according to Paget and Barnes (1973) and the drugs were given orally for 30 consecutive days. After 30 days of treatment, 5 animals of each group were decapitated, while the other 5 were kept for 15 days (recovery period) without any treatment. Blood samples were collected for haematological studies. The analysis of blood samples included :

- Red blood cells count (RBCs) according to the method of Dacie & Lewis (1991).
- Total white blood cell count (WBCs) according to the methods of Mitruka *et al*. (1977).
- Estimation of haemoglobin concent-ration according to the method of Drabkin & Austin (1932).
- Estimation of haematocrit value (Hct) by using heparinized cappillary tubes (Rodak, 1995).
- Calculations of MCV, MCH, MCHC were done according to Dacie & Lewis (1991).

The body weight of each rat was recorded at the beginning of treatment then after the 30 days of treatment period and at the end of recovery period for calculation of the body weight change.

Also, the weights of brain, heart, liver. kidneys, testes and spleen were recorded after treatment and recovery periods. Heart rate (stethoscope) calculated as beat/min and respiratory rate (count the number of times of the stomach or chest rises for 15 seconds x 4 = act/min) as act/min. Rectal temperature was taken with a thermometer. Measuring of skin-fold thickness was done after shaving hair at tested sites using special micrometer according to the method of Franzini and Grines (1976). All the data were statistically analyzed using student *t* test.

Results

The present study showed significant decrease ($P < 0.05$), very highly significant decrease ($P < 0.001$) and highly significant decrease ($P < 0.01$) in RBCs count in addition to highly significant decrease ($P < 0.01$), very highly significant decrease ($P < 0.001$& $P < 0.001$) in WBCs count after treatment with apple-lite, mirapro-N and tenuate respectively for 30 conscutive days of experimental rats compared with control group. After recovery period, RBCs count showed insignificant change in rats treated with apple-lite only but still recorded very highly significant decrease ($P < 0.001$) in both mirapro-N and tenuate groups after 15 days of recovery period. Meanwhile, WBCs showed significant decrease ($P < 0.05$) in apple-lite treated rats and very highly significant decrease ($P < 0.001$) in both mirapro-N and tenuate treated groups after recovery period (Table 1). Also, significant decrease ($P < 0.05$) in Hb concentration was recorded in rats after treatment with apple-lite and mirapro-N while tenuate caused very highly significant decrease ($P < 0.001$) in Hb concentration compared with control group. Hct value revealed very highly significant decrease ($P < 0.001$) in all groups of treated rats after 30 days of treatment (Table 1). The same table revealed that non-significant change was recorded in Hb level of rats treated with apple-lite after recovery period but highly significant decrease ($P < 0.01$) and very highly significant decrease ($P < 0.001$) in Hb level still exist after recovery period. Moreover very highly significant decrease ($P < 0.001$) of Hct value was observed in

the three groups of treated rats after recovery period.

Table (1) showed non-significant change of calculated mean cell volume (MCV), mean cell haemoglobin (MCH) and mean cell hemoglobin concentration (MCHC) in all treated groups after treatment and recovery periods except apple-lite and tenuate groups which showed highly significant increase ($P < 0.01$) in MCHC after recovery period. Table (2) revealed body weight loss ($P < 0.001$) in rats treated with apple-lite, highly significant decrease ($P < 0.01$) in body weight of rats treated with mirapro-N and significant decrease ($P < 0.05$) in body weight of rats treated with tenuate for 30 days, while non-significant change of the same parameter was recorded after recovery period compared with the initial body weight as control value.

The present study showed that skin-fold thickness of gluteal region induced very highly significant decrease ($P < 0.001$) in all treated groups after treatment period. The significant decrease ($P < 0.01$, $P < 0.01$ and $P < 0.05$) still exist after recovery period in rats treated with apple-lite, mirapro-N and tenuate drugs respectively (Table 3). Skin-fold thickness of back region showed significant decrease ($P < 0.01$, $P < 0.001$ and $P < 0.05$) after apple-lite, mirapro-N and tenuate for treatment and recovery periods. Mirapro-N treated rats which showed insignificant change after recovery period only. The same table (3) records that skin-fold thickness of belly region affected by significant decrease ($P < 0.01$ and $P < 0.001$) in the mirapro-N and tenuate-treated groups after treatment and recovery periods while apple-lite treatment caused insignificant change in belly region after both periods compared with the control group.

Table (4) reveals no significant change in brain weight of the three groups of rats after treatment period while significant decreases ($P < 0.05$, $P < 0.001$, $P < 0.05$) in brain weight were recorded after recovery period. Moreover, a significant decrease ($P < 0.05$) in the heart weight after mirapro-N treatment while non-significant change of heart weight was observed in rat groups treated with either apple-lite or tenuate after the period of treatment. No significant changes were recorded in this parameter after recovery period. Significant increases in hepatosomatic ratio ($P < 0.05$) were observed in the rat groups treated with mirapro-N and tenuate while apple-lite showed insignificant change after the treatment period. Also no significant changes were recorded in this parameter in all treated groups after recovery period when compared with control group (Table 4). Table (4) reveals very highly significant increase ($P < 0.001$) in kidneys weight after tenuate treatment for 30 days while non-significant change in this parameter was recorded after recovery period in the same group compared with the control group. Also, both apple-lite and mirapro-N caused no significant change in kidneys weight after treatment and recovery period. No significant changes were observed in spleen weight of rats after treatment and recovery periods compared with the control group (Table 4). The same table shows that gonadosomatic ratio was significantly decreased ($P < 0.05$) in groups of rats treated with mirapro-N and tenuate for 30 days; these effects exist after the recovery period recording significant decrease $P < 0.05$ and $P < 0.001$ respectively while apple-lite showed no significant changes after treatment and recovery periods.

Table (5) reveals that apple-lite and mirapro-N resulted in non-significant changes in heart rate, respiratory rate and rectal temperature after treatment and recovery periods. Tenuate treatment showed insignificant changes in heart rate and respiratory rate while significant increase ($P < 0.05$) in rectal temperature was observed after treatment period. After recovery period, tenuate treated rats showed non-significant change in the three tested parameters compared with the control group (Table 5).

Table (1): Effect of apple-lite, mirapro-N and tenuate on red blood cells count (RBCs), white blood cells count (WBCs), hemoglodin content (Hb), hematocrit value (Hc), mean all volume (MCV), mean cell haemoglobin (MCH) and mean cell haemoglobin conc. (MCHC) after treatment and recovery periods.

Group / Parameters		Treated period				Recovery period			
		Control	Apple-lite	Mirapro-N	Tenuate	Control	Apple-lite	Mirapro-N	Tenuate
RBCs ($x 10^6$)	M ± SD P	6.04 ± .5	5.4 ± .4 < 0.05	4.86 ± .4 < 0.001	5.1 ± .55 < 0.01	6.2 ± .47	5.8 ± .76 N.S.	4.9 ± .42 < 0.001	5.1 ± .55 < 0.001
WBCs ($x 10^3$)	M ± SD P	9 ± .79	7.5 ± .61 < 0.01	7 ± .79 < 0.001	6.76 ± .98 < 0.001	8.7 ± .57	8.1 ± .39 < 0.05	7.1 ± .42 < 0.001	7.3 ± .57 < 0.001
Hb (g %)	M ± SD P	15.1 ± 0.82	14 ± 0.38 < 0.05	13.88 ± 1.04 < 0.05	12.7 ± .6 < 0.001	15.1 ± .82	14.4 ± .38 N.S.	13.9 ± 1.04 < 0.001	12.7 ± .57 < 0.001
Hct (%)	M ± SD P	42.8 ± 2.8	37.4 ± 1.7 < 0.001	37.8 ± 1.8 < 0.001	33.2 ± 1.3 < 0.001	42.8 ± 2.8	37.4 ± 1.7 < 0.001	37.8 ± 1.8 < 0.001	33.2 ± 1.3 < 0.001
MCV (μ^3)	M ± SD P	71.6 ± 9.08	69.3 ± 4.9 N.S	78.1 ± 6.5 N.S	65.7 ± 7.2 N.S	71.5 ± 9.7	69.5 ± 4.6 N.S.	78.1 ± 6.5 N.S	65.7 ± 7.2 N.S
MCH (pg/dl)	M ± SD P	25.3 ± 2.8	26.9 ± 2.1 N.S	28.9 ± 4.2 N.S	25.1 ± 3.1 N.S	25.2 ± 2.9	26.8 ± 2.1 N.S.	28.8 ± 4.04 N.S	25.1 ± 3.1 N.S
MCHC (%)	M ± SD P	33.8 ± 2.7	35.9 ± .72 N.S	36.7 ± 4.1 N.S	36 ± 6.2 N.S	35.9 ± 2	38.9 ± .6 < .01	36.5 ± 1.8 N.S	38.8 ± .81 < 0.01

Significant P < 0.05 Highly significant P < 0.01 Very highly significant P < 0.001
Non-significant N.S

Table (2): Effect of apple-lite, mirapro-N and tenuate on body weight after treatment and recovery periods.

Group / Parameters		Apple-lite			Mirapro-N			Mirapro-N		
		I.C.	T.P. (30 days)	R.P	I.C.	T.P. (30 days)	R.P	I.C.	T.P. (30 days)	R.P
Body weight	M ± SD P	133.8 ± 4.8	120.4 ± 6.5 < 0.001	128.6 ± 4.1 N.S	135.6 ± 8.02	123.2 ± 5.2 < 0.01	129.8 ± 7.2 N.S	132.2 ± 5.2	124 ± 4.2 < 0.05	127.6 ± 4.8 N.S

I.C. = Initial Control T.P. = Treated Period R.P. = Recovery Period
Significant P < 0.05 Highly significant P < 0.01 Very highly significant P < 0.001
Non-significant N.S

Table (3): Effect of apple-lite, mirapro-N and tenuate on skin-fold thickness of gluteal, back and belly regions after treatment and recovery periods.

Group / Parameters			Treated period				Recovery period			
			Control	Apple-lite	Mirapro-N	Tenuate	Control	Apple-lite	Mirapro-N	Tenuate
Skin-fold Thickness	Irgion Gluteal Region (mm)	M ± SD P	0.99 ± 0.07	0.85 ± 0.05 < 0.001	0.84± 0.1 < 0.001	0.81 ± 0.07 < 0.001	1.07 ± 0.1	0.91 ± 0.04 < 0.01	0.89 ± 0.74 < 0.01	0.9 ± 0.07 < 0.05
	Back (mm)	M ± SD P	0.85 ± 0.06	0.73 ± 0.06 < 0.01	0.7 ± 0.1 < 0.001	0.76 ± 0.1 < 0.05	0.96 ± 0.04	0.84 ± 0.06 < 0.01	0.9 ± 0.07 N.S	0.9 ± 0.03 < 0.05
	Belly (mm)	M ± SD P	0.60 ± 0.05	0.56 ± 0.04 N.S	0.5 ± 0.04 < 0.01	0.48 ± 0.03 < 0.001	0.6 ± 0.1	0.56 ± 0.04 N.S	0.5 ± 0.04 < 0.01	0.48 ± 0.03 < 0.001

Significant P < 0.05 Highly significant P < 0.01 Very highly significant P < 0.001
Non-significant N.S

Table (4): Effect of anorexic drugs, apple-lite, mirapro-N and tenuate on percent of organs weight / body weight ratio after treatment and recovery periods.

Parameters		Group	Treated period				Recovery period			
			Control	Apple-lite	Mirapran-N	Tenuate	Control	Apple-lite	Mirapran-N	Tenuate
% of organs weight / Body weight	Brain	M ± SD P	1.6 ± 0.08	1.6 ± 0.1 N.S	1.52 ± 0.13 N.S	1.68 ± 0.08 N.S	1.82 ± 0.04	1.68 ± 0.13 < 0.05	1.64 ± 0.11 < 0.001	1.76 ± 0.06 < 0.05
	Heart	M ± SD P	0.5 ± 0.07	0.48 ± 0.08 N.S	0.6 ± 0.07 < 0.05	0.46 ± 0.05 N.S	0.58 ± 0.08	0.58 ± 0.08 -	0.6 ± 0.1 N.S	0.58 ± 0.08 -
	Liver	M ± SD P	3.9 ± 0.2	4.6 ± 0.97 N.S	4.62 ± 0.61 < 0.05	4.76 ± 1.01 < 0.05	4.38 ± 0.51	4.74 ± 0.3 N.S	4.72 ± 0.26 N.S	4.8 ± 0.27 N.S
	Kidneys	M ± SD P	0.76 ± 0.3	0.8 ± 0.1 N.S	0.86 ± 0.13 N.S	1.02 ± 0.08 < 0.001	1.04 ± 0.08	0.97 ± 0.11 N.S	0.99 ± 0.02 N.S.	1.03 ± 0.1 N.S
	Spleen	M ± SD P	0.76 ± 0.15	0.8 ± 0.22 N.S	0.84 ± 0.18 N.S	0.84 ± 0.15 N.S	0.72 ± 0.13	0.8 ± 0.16 N.S	0.64 ± 0.13 N.S	0.72 ± 0.18 -
	Testes	M ± SD P	2.1 ± 0.4	1.8 ± 0.16 N.S	1.58 ± 0.08 < 0.05	1.58 ± 0.15 < 0.05	2.32 ± 0.18	2.38 ± 0.19 N.S	2.04 ± 0.27 < 0.05	1.88 ± 0.08 < 0.001

Significant P < 0.05 Highly significant P < 0.01 Very highly significant P < 0.001
Non-significant N.S

Table (5): Effect of anorexic drugs, apple-lite, mirapro-N and tenuate on some vital signs, eg. heart rate, respiratory rate and rectal temperature after treatment and recovery periods.

Group / *Parameters*		*Treated period*				*Recovery period*			
		Control	*Apple-lite*	*Mirapro-N*	*Tenuate*	*Control*	*Apple-lite*	*Mirapro-N*	*Tenuate*
Heart rate (beat/min)	M ± SD P	285 ± 5.0	294 ± 16.7 N.S	292.8 ± 9.96 N.S	295 ± 11.2 N.S	294 ± 5.5	292 ± 4.5 N.S	292 ± 8.4 N.S	294 ± 8.9 N.S.
Respiratory rate (act/min)	M ± SD P	66.4 ± 4.62	67.4 ± 4.5 N.S	68.8 ± 6.5 N.S	68.8 ± 4.2 N.S	69 ± 5.5	64.2 ± 3.5 N.S.	64 ± 4.2 N.S	65.4 ± 0.55 N.S.
Rectal temp. (^oC)	M ± SD P	32.6 ± 0.9	33.7 ± 0.9 N.S.	33.4 ± 1.01 N.S.	34.8 ± 1.6 < 0.05	33 ± 0.8	33.2 ± 1.6 N.S.	33.7 ± 0.75 N.S	33.3 ± 0. 7 N.S

Significant $P < 0.05$ Non-significant N.S

Discussion

The present study showed that RBCs and WBCs count were significantly decreased after treatment and recovery periods in three treatment groups (Apple-lite, mirapro-N and tenuate). RBCs count of apple-lite treatment showed insignificant change after recovery period. Atkinson and Brent (1982) found that hematocrit, white blood cell count (WBCs) percent polymorphonuclear leucocytes and rectal temperature didn't significantly change after intraperitoneal injection of rats with 6-7 ml of bypass plasma (containing humoral factor that suppresses food intake). Many authors recorded harmful effect due to chemical drugs [fenfluramine, dexfenfluramine, look-alike, 3,4-N-methelenedioxymethamphetamine (MDMA or ecstasy), diethylepropion hydrochloride (Tenuate), D-norpseudoephedrine (mirapro-N) and sibutramine] which are perscriped as appetite suppressant and obesity treatment (Lee *et al.*, 1979; Garriott *et al.*, 1985; Genn *et al.*, 1994; Nesoli & Carruba, 2002, 2003; Conductier *et al.*, 2005; Hsieh *et al.*, 2005; Mekontso *et al.*, 2006 ; Nordheim *et al.*, 2006). In contrast, Crenier and Stensnon (1999); Gokcel *et al.* (2002); Naumov *et al.*, (2002) ; Rodrigues *et al*. (2002) recorded no side effect for chemical drugs fenproporex, sibutramine and orlistat "xinical". The present study revealed significant decrease of rat's body weight after 30 days of treatment with apple-lite, mirapro-N and tenuate, while non-significant change of body weight in the three treated groups were recorded after the recovery period. Appetite suppressants loss efficacy when given chronically; the mechanisms are unknown (Choi *et al.*, 2006). The same authors observed that when rats were injected with fenfluramine (dl-FEN, 5mg/kg.i-p) daily for 15 days then, measured mRNA expression of corticot-ropin releasing factor (CRF), neuropeptide γ (NPγ) and proopiomelanocortin (POMC) in hypothalamic neurons on days 1, 2 & 15, decreased in food intake found on 1, 2 but not on 15 days. The present study showed that all the three treatment resulted in a significant decrease in skin-fold thickness of gluteal, back and belly regions of rats after treatment period. This effect still exist after recovery period except the skin-fold thickness of back region in mirapro-N treated-group and the skin fold thickness of belly region of apple-lite treated group

which showed non-significant change. These findings agree with and conco-mitant to the results of body weight. The tested drugs decreased food intake, so they reduced body weights and prevented fat deposition in the gluteal back and belly regions. In the present study, the significantly increase in hepatosomatic ratio may not attributable to an increase in the liver weight but it is due to severe reduction in body weight after treatment period. Moreover, the significant decrease in gonadosomatic ratio could be due to severe disturbance in lipid metabolism induced by tested drugs. Both heart rate and respiratory rate showed non-significant change in all treated groups after treatment and recovery periods except respiratory rate in apple-lite and tenuate groups, which showed significant decrease after recovery period only. Meanwhile, insignificant change in rectal temperature was recorded in all treated groups after treatment and recovery periods except tenuate group which recorded significant increase in rectal temperature after treatment period. According to Narkiewicz (2002), sibutr-amine can producedose- dependent increases in blood pressure and heart rate, especially during initial treatment. Thus, patients who lose 5% or more of initial body weight have a reduction in blood pressure. Poston and Foreyt (2004) stated that the blood pressure and heart rate should be monitored in patients using sibutramine and it may not be applicable in obese patients with significant cardiovascular disease. Recent study of Kim *et al*. (2005) revealed that sibutramine mesylate was administered orally to mice, rats and dogs at dose levels of 1.15, 3.45 and 11.5 mg/kg to measure its effects on the central nervous system (CNS), general behaviour, cardiov-ascular, respiratory system and other organ systems. The authors concluded that sibut-ramine caused effects on the respiratory rate, locomotor activity, hexobarbital-induced sleep time, gastrointestinal transp-ort and gastric secretion at a dose level of 3.45 mg/kg or greater. Although the tested drugs in the present study were effective in their main target (loss of weight) but induce harmful effects specially on haematological parameters. So the usage of these medication should be controlled and monitored periodically.

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تأثير عقاقير التخسيس على بعض القياسات الدموية والمؤشرات الحيوية فى الجرذان البيضاء

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صممت هذه الدراسة لتقييم أثر استخدام ثلاثة عقاقير من مثبطات الشهية على صورة الدم وبعض القياسات الفيزيائية الحيوية وهى معدل التنفس ومعدل ضربات القلب ودرجة الحرارة ووزن الجسم والأعضاء المختلفة فى الجرذان البيضاء – واستخدم 40 من ذكور الجرذان البيضاء البالغة يزن الواحد منها 130 ± 20جم وتم تقسيمها إلى 4 مجاميع متساوية كالتالى :
المجموعة الأولى : اعتبرت مجموعة ضابطة وتركت بدون أى معاملة.
المجموعة الثانية : أعطيت عقار Apple-lite (3.5مجم/100جم من وزن الجسم) عن طريق الفم.
المجموعة الثالثة : عوملت بعقار Mirapro-N (0.14 مجم/100جم من وزن الجسم) عن طريق الفم.
المجموعة الرابعة : عوملت بعقار Tenuate (0.1 مجم/ 100جم من وزن الجسم) عن طريق الفم.
وقد تم تقييم التغييرات الحادثة فى صورة الدم والقياسات الفيزيائية بعد 30 يوم من المعاملة وكذلك بعد فترة الراحه (15 يوم)، وقد أظهرت النتائج حدوث انخفاض ذى دلالة إحصائية فى خلايا الدم الحمراء والبيضاء بعد فترة المعاملة (30 يوم)، وقد استمر هذا الانخفاض المعنوى بعد فترة الراحه عدا المجموعة المعاملة بـ apple-lite حيث سجلت أعداد الخلايا الحمراء تحسناً ملحوظاً فى فترة الراحه، وقد حدث أيضاً نقص ذو دلالة إحصائية فى محتوى الهيموجلوبين Hb والهيماتوكريت فى المجموعات الثلاثة فى فترتى المعاملة والراحه عدا مجموعة Apple-lite فقد حدث فيها تحسن فى محتوى الهيموجلوبين بعد فترة الراحه فقط. وقد حدث أيضاً زيادة ذات دلالة إحصائية فى متوسط تركيز الهيموجلوبين الخلوى MCHC فى المجموعة التى عوملت بالـ Apple-lite والـ Tenuate بعد فترة الراحه فقط.
كما أظهرت النتائج نقصاً ذا دلالة إحصائية فى وزن الجسم فى المجموعات الثلاثة المعاملة بعد فترة المعاملة، وحدث تحسن فى وزن الجسم بعد فترة الراحه فى المجموعات الثلاثة، وكذلك حدث نقص فى سمك طبقات الجلد فى المناطق الثلاث (الإلية، الظهر والبطن) ذو دلالة إحصائية بعد فترتى المعاملة والراحه فى المجموعات الثلاث عدا منطقة الظهر فى المجموعة المعاملة بـ Mirapro-N والبطن فى المجموعة المعاملة بـ Apple-lite فقد أظهرت تحسناً فى فترة الراحه.
وأظهرت النتائج نقص وزن المخ نقصاً ذو دلالة إحصائية بعد فترة الراحه فى المجموعات الثلاثة بينما حدثت زيادة معنوية فى وزن القلب فى المجموعة المعاملة بـ Mirapro-N بعد فترة المعاملة فقط بينما سجل وزن الكبد زيادة ذات دلالة إحصائية فى كل من المجموعة المعاملة بـ Mirapro-N و Tenuate بعد فترة المعاملة تحسنت بعد فترة الراحه. وقد زاد وزن الكليتان زيادة ذات دلالة إحصائية فى المجموعة المعاملة بـ Tenuate بعد فترة المعاملة تحسنت هذه الزيادة بعد فترة الراحه بينما زاد وزن الكليتين زيادة إحصائية بعد فترة الراحه فقط فى المجموعة المعاملة بـ Mirapro-N كما لم يتأثر وزن الطحال فى المجموعات الثلاث بعد فترتى المعاملة والراحه بينما أظهرت الخصى نقصاً ذا دلالة إحصائية بعد فترة المعاملة فى المجموعتين المعاملتين بـ Mirapro-N و Tenuate استمر بعد فترة الراحه. وأظهرت النتائج عدم تأثر كل من معدل ضربات القلب ومعدل التنفس بعد فترة المعاملة (30 يوماً) وفترة الراحه.

كما سجلت درجة الحرارة زيادة ذات دلالة إحصائية فى المجموعة المعاملة بـ Tenuate فقط تحسنت بعد فترة الراحه.

ومما تقدم يتضح أنه بالرغم من نجاح العقاقير المستخدمة فى إنقاص الوزن إلا أنه قد تحدث آثار جانبية وخاصة فى القياسات الدموية مما يستلزم إجراء الفحوصات الدورية عند إستعمال هذه العقاقير.