The hematological and clinical changes in rabbits exposed to powder of dried leaves of (*Lantana camara*) under experimental conditions

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(Received 15 September 2013, Accepted 18 November 2013)

Abstract

The study was conducted on 10 local breed rabbits, 1-2 years of age, and 1- 1.5 kg body weight. Animals were divided into two equal groups. The first was the treated group which exposed to the dried powder of *Lantana camara* leaves mixed with the food at a dose rate of 5 g/ animal / day for three weeks, while the second group left without treatment as a control group. Clinically the study was revealed that the body temperature and body weight did not show any changes during the experiment, while the respiratory and heart rate were increased. Hematologically the bleeding time and clotting time were prolonged, the erythrocyte count, Hb concentration, and MCV values were decreased, and the MCH was increased, while the PCV, MCHC, total leucocytes count and the basophiles percentage did not showed any significant changes. The heterophiles and monocytes percentage were increased mean while the lymphocytic and eosinophil percentage were decreased during the study.

Key words: *Lantana camara*, hematology, rabbits.

التغيرات السريرية والدمية في الأرانب عند التعرض إلى المسحوق المجفف لأوراق اللنتانا كامارا (المينا الشجري) (*Lantana camara*) تحت الظروف التجريبية

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الخلاصة

أنجزت الدراسة على 10 أرانب محلية ، بعمر 1-2 سنة ، ووزن 1- 1.5 كغم . قسمت الحيوانات إلى مجموعتين بواقع 5 حيوانات في كل مجموعة . عرضت المجموعة الاولى الى المسحوق المجفف لأوراق نبات اللنتانا كامارا الممزوج مع العلف المركز بواقع 5 غم \ حيوان \ يوم ولمدة ثلاثة أسابيع . بينما تركت المجموعة الثانية كمجموعة سيطرة بدون تعرض سريريا أظهرت نتائج الدراسة عدم وجود تغير في درجة الحرارة ، ووزن الجسم ، بينما اظهر معدل التنفس ، وضربات القلب ارتفاعا معنويا . و دمويا اظهر معدل زمن النزف ومعدل زمن التخثر اطالة في الزمن ، بينما اظهر عدد خلايا الدم الحمر، وتركيز خضاب الدم ، ومعدل حجم الخلية هبوطا معنويا . أما حجم الخلايا المرصوفة ، ومعدل تركيز خضاب الخلية فلم تظهر اي تغير ، بينما اظهر معدل خضاب الخلية ارتفاعا في قيمته . لم تظهر اعداد خلايا الدم البيض ونسبة القعدات تغيرا . بينما شهدت نسبة المختلقات والخلايا الأحادية ارتفاعا ، وظهر هبوطا في نسبة للمفاوية و الحمضات .
الكلمات المفتاحية : اللنتانا كامارا، الارانب ، التغيرات السريرية ، التغيرات الدمية.

Introduction

Lantana is a natural plant from the pyrrolizidine alkaloids in the family of *Verbenaceae*. Parts of the plant when it is boiled can be used in tetanus treatment, rheumatism. Leaves are used as disinfectant for wounds, treatment of abrasions, and as

lotion or fomentation for treatment of joints swelling (1). The principal active ingredient of *lantana camara* is triterpine acid (2- 7). *Lantana camara* L. (*Verbenaceae*) is commonly known as the wide or red sage. It is the most widespread species in the genus

lantana (8,9). It is also listed as one of the most important medicinal plants around the world (10). The toxic dose depend upon the mode of induce the toxicity either through the exposure to leaves naturally or experimentally, in addition to form of the plant (green, dry leaves or as extract). Sheep and cattle showed a signs of toxicity post exposure to the dry leaves in a doses of (2, 4, 6, 8, 10 ,12) gm / kg b.w. for 7- 18 days. Meanwhile laboratory animals showed a signs of toxicity post exposure to leave

extract at a dose of 100 – 125 mg / kg b.w. (11, 12) . Sharma et al., (13) describe the disease of rabbits resulted from giving different doses (2, 4, 6 gm/ kg b.w.) of extracted material of dry leaves 100 – 125 mg / kg b.w. post 4- 6 days. (14) referred to 0.5 and 1 gm / kg b.w. of dry leaves of *Lantana camara* did not cause toxicity in rabbits, while exposure to dry leaves at a dose of 2, 4, 6 gm/ kg lead to occurrence of toxicity and appearance of clinical signs of toxicity.

Materials and methods

The study was conducted on 10 local breed rabbits 1-2 years of age, and 1- 1.5 kg body weight. Rabbits were fed on concentrated food, and water giving ad libitum. They kept in room temperature (20- 25 °C), with half day light. Animals were divided into two equal groups. The exposed group receive the plant as powder form mixed with the food at a dose rate of 5 g/kg b.w. daily for three weeks, while the other group left without exposure as a control group. The main parameters depended in the

study were included the clinical parameters (body temperature, heart rate, respiratory rate in addition to monitor the appetite, nature of feces, and any abnormal signs appear during the study). Hematologically the main parameters were, RBC, WBC, Hb, PCV, Red cell indices, bleeding time, clotting time according to (15). The results were analyzed statistically by the T test and LSD (the least significance, with a degree of $P < 0.05$ and $P < 0.01$) according to (16).

Results

The body temperature, and body weight did not show any significant changes during the experiment. The respiratory rates was increased non significantly during the first week post exposure in comparison with pre-exposure values. While it is significantly increased in comparison with the control value in the same week at $P < 0.05$. During the second week post exposure to plant the respiratory rate was significantly decreased, which was significant at a level of ($P < 0.05$) in comparison with the level in pre- exposure time. During the third week although it rise, but still lower than the level of pre-exposure time and not significantly differ than it, but it was significantly differ at the level of ($P < 0.05$) in comparison with the level during the second week (Table 1). The heart rate decreased during the first week post exposure, which was significantly differ at a

level of ($P < 0.05$) in comparison with the level of control group in the same week. During the second week post exposure to plant the heart rates increased, which was significant at ($P < 0.01$) in comparison with the pre- exposure level, and the level in the first week post exposure. During the third week the heart rates increased to the maximum level , which was significantly differ at a level of ($P < 0.01$) in comparison with the level in pre- exposure and the level during the first week post exposure to plant (Table 1). The bleeding time was prolonged during the first week post exposure to the plant, which was significantly differ at a level of ($P < 0.05$) in comparison with the value of control group , and the level pre-exposure to plant during the third week more prolonged, and significantly differ at a level of $P < 0.05$ in comparison with the level in

Table (1): The body temperature, respiratory rates, heart rates, and body weight of the control and treated groups.

Parameters	Groups	Weeks			
		0	1	2	3
Body temp. °C	Treated	37.66±0.92	37.3±0.45	37.94±0.27	38.36±0.38
	Control	37.66±0.92	37.85±0.32	37.02±0.36	37.17±0.18
Respiratory rate / minute	Treated	139.5±8.27	146.4±16.18 A**	102.8 ±18.10 a*	157.2 ±12.35 c*
	Control	139.5±8.27	150±17.35	141±8.10	146.25±15.65
Heart rate beat / minute	Treated	249±11.40	208.8 ±27.19 A*	330 ±16.47 a**b*	392 ±40.03ab**
	Control	249±11.40	271±14.36	281.5±33.09	282.5±41.70
Body weight / Kg	Treated	1.46±0.1	1.40±0.07	1.39±0.07	1.38±0.08
	Control	1.46±0.1	1.46±0.18	1.49±0.15	1.47±0.12

The values are Mean ± SE. a. means significance in comparison with 0 time of treated group, b. in comparison with 1st week, c. in comparison with 2nd week, A. significance in comparison with control group in the same week. * significance at P < 0.05, ** at P < 0.01.

Table (2): Bleeding time and clotting time of control and treated groups.

Parameters	Groups	Weeks			
		0	1	2	3
Bleeding time Second	Treated	21.8±6.74	37±6.45 a A*	32±4.64	41±5.35 aA*
	Control	21.8±6.74	30±7.90	25±6.12	28.75±9.43
Clotting time Second	Treated	40.7±9.16	53±12.13	55±10.39	119±14.90 aA*
	Control	40.7±9.16	18.75±2.39	20.25±8.26	21.75±13.90

The values are Mean ± SE. a. means significance in comparison with 0 time of treated group, b. in comparison with 1st week, c. in comparison with 2nd week, A. significance in comparison with control group in the same week. * significance at P < 0.05, ** at P < 0.01.

pre- exposure time and control group at the same week (Table 2). There was no significant prolongation in the clotting time during the first and second weeks, but it become significantly different during the third week post exposure to plant with the value pre- exposure and with value of control group at the same week (Table 2). The erythrocyte count, hemoglobin values, packed cell volume, mean corpuscular hemoglobin concentration did not showed any significant changes during the experiment. During the second week the mean corpuscular hemoglobin was significantly decreased at a level of (P < 0.05) in comparison with the level of first week post exposure. During the third week it increased, which was significantly differ in comparison with the level during the second week post exposure to plant and those of control group, at a level of (P < 0.05). The mean cell volume during the third week increased significantly at level of P < 0.05 in comparison with control group at the same week (Table 3). The total leucocytes count

did not significantly changed during the experiment. During the first week, the Heterophils percent was significantly decreased at a level of (P < 0.05) in comparison with the pre- exposure value. During the second week post exposure it was increased, which was differ at a level of (P < 0.05) in comparison with the value during the first week post exposure to plant and control group value. During the third week post exposure it reached the maximum level, which was significant at a level of (P < 0.05). in comparison with the level in pre- exposure time, and (P < 0.01) in comparison with level during the first week post exposure, and value of the control group (Table 4). The lymphocytic percent non significantly increased in the first week post exposure to plant in comparison with the pre- exposure time level. During the second week post exposure to plant it decreased non significantly in comparison with the pre – exposure time level, but differ at level of P < 0.05 in comparison with control group values. During the thirds week it decreased to

Table (3): Total erythrocyte counts, Hb concentration, Packed cells volume, Mean cell volume, Mean cell hemoglobin, Mean cell Hemoglobin concentration of control and treated groups.

Parameters	Groups	Weeks			
		0	1	2	3
RBC X10 ⁶ /μl	Treated	4.56±0.5	4.26±0.25	5.48±0.99	3.91±0.24
	Control	4.56±0.5	4.34±0.45	4±0.34	4.87±0.46
Hb g/ dl	Treated	12.32±0.41	12.37±0.39	12.3±0.55	11.78±0.56
	Control	12.32±0.41	12.07±0.56	12.25±0.67	12.55±0.70
PCV %	Treated	35.4±1.95	36.4±1.12	36±1.64	35±1.67
	Control	35.4±1.95	35.5±1.55	36±1.91	34.75±0.75
MCV Fl	Treated	80.26±8.89	85.94±2.95	70.73±7.29	89.73 ±2.85 A*
	Control	80.26±8.89	74.38±9.05	76.36±13.14	73.36±7.21
MCH Pg	Treated	27.04±2.63	29.1±1.07	24.15 ±2.47 b*	30.19 ±0.90 Ac*
	Control	27.04±2.63	28.70±3.12	25.30±5.63	26.24±1.97
MCHC g/ dl	Treated	35.31±1.71	33.84±0.15	34.16±0.09	32.33±1.28
	Control	35.31±1.71	34.68±0.66	34.01±0.13	36.15±2.166

The values are Mean ± SE. a. means significance in comparison with 0 time of treated group, b. in comparison with 1st week, c. in comparison with 2nd week, A. significance in comparison with control group in the same week. * significance at P < 0.05, ** at P < 0.01.

Table (4): Total leucocytes count and differential leucocytes count of control and treated groups.

Parameters	Groups	Week			
		0	1	2	3
WBC X10 ³ /μl	Treated	4955±374.14	5720±2.95	5180±7.29	4364±2.85
	Control	4955±374.14	5700±750.83	5225±919.35	5137.5±1191.70
H%	Treated	39±2.27	35.2 ±1.07 a*	52.6 ±2.47 Ab*	56.6 ±0.90 a*bA**
	Control	39±2.27	39.25±3.88	34.25±4.02	40.25±4.00
L%	Treated	54.9 ±1.10	51.2±0.15	46 ±0.09 A*	38.2 ±1.28 a*A**
	Control	54.9±1.10	42.75±4.98	54±3.87	45.75±3.19
E%	Treated	4.2±1	8.2±3.20	0.4 ±0.24 a**b*	1.8 ±0.37 b*c**
	Control	4.2±1	5±0.70	2±0.28	3.25±0.47
M%	Treated	2.6 ±1.50	3±4.43	1.2 ±6.30 b*	3.4 ±3.36 a*b**
	Control	2.6±1.50	3.25±0.62	1.25±0.25	2.75±0.25
B%	Treated	0.4±2.03	0.6±7.28	0	0.6±3.82
	Control	0.4±2.03	0.75±0.47	0	0

The values are Mean ± SE. a. means significance in comparison with 0 time of treated group, b. in comparison with 1st week, c. in comparison with 2nd week, A. significance in comparison with control group in the same week. * significance at P < 0.05, ** at P < 0.01.

more lower levels, which was significant at level of (P < 0.05) in comparison with pre-exposure time level, and with control group (Table 4). Eosinophil percent was not significantly increased during the first week. but significantly decreased in the second week post exposure to plant which was significant at a level of (P < 0.01) in comparison with the pre- exposure time level, and at a level of (P < 0.05) in comparison with the level of the first week post exposure to plant. During the third week post exposure it reached a level, which

was significant at a level of (P < 0.05) in comparison with the level in first week post exposure and (P < 0.01) in comparison with the level of second week post exposure (Table 4). The monocytes percent increased during the third week post exposure to the level reached, which was significantly differ at a level of (P < 0.05) in comparison with pre- exposure time level and a level of (P < 0.01) in comparison with the level in first week post exposure to plant (Table 4). The basophils percent did not showed any significant changes during the experiment.

Discussion

The results of the study revealed no changes in body temperature. Researchers (17, 18, 19) they refer to rise in body temperature in buffalo calves exposed to the plants. Increased in body temperature in rabbits, with increase in respiratory and heart rate and nonspecific fever (18,19, 20). The results of the study revealed increase in heart beats. (17, 21, 22) referred to occurrence of necrosis in myocardium which indicate the direct toxic effect on heart tissues, patchy degeneration in myocardial fibers. (20) attribute the heart failure to these lesions. (21) confirm the direct effect of toxic material in leaves of *lantana camara* on heart tissue that leads to tachycardia. The results of the study revealed increase in respiratory rates, (23, 19) refer to increased respiratory and heart beat in poisoning due to hypoxia as a results of decreased in RBC count and Hb. (22) observed pulmonary edema , congestion of blood vessels, alveoli, filled with pink color fluid homogenous fluid. alveoli dilatation, pulmonary emphysema, hydrothorax. (23, 19) refers to increased respiratory rate and heart rate to anemic anoxia Increased heart beat due to anemia in rabbits which leads to tachycardia and increase cardiac output and shorten circulation time that lead to cardiac hypertrophy (24, 2). The results of the study

revealed decreased, RBC counts, Hb concentration and MCH, while PCV, MCHC did not showed any changes. The values of MCV increased. (25, 26, 27) refer to acute deficiency in RBC counts, Hb, and platelets. (28) refer to slight decrease in RBC, and Hb. (28 , 22, 29) , refer to partial lysis of RBC due to toxicosis. (24 , 30 , 19) refer to anemia. (18 , 26 , 27) refer to clear increase in PCV in sheep, cattle and buffaloes. (26) attribute this increase to hemoconcentration , and dehydration. (27) attributed this increase in PCV to the increase in decrease of body protein synthesis. The results of the study revealed bleeding time and clotting time prolongation. (18 , 26 , 30) increased in bleeding and clotting time . increase in bleeding and clotting time. (27) increase in bleeding time in sheep attributed to decrease in prothrombin with decrease in protein synthesis and fibrinogen due to hepatic damage. The results of the study revealed WBC count not changes. Heterophils percentage increased. lymphocytes decreased, eosinophils decreased, monocytes increase, basophils not changes. (26, 27, 30) refer to increase in WBC counts, neutrophils increase, lymphocytes decreased. (28) increase in total WBC. (25) slight increase in neutrophils.

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