

EFFECT OF *NERIUM OLEANDER* POISONING ON BLOOD OF MALE GUINEAPIGS

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ABSTRACT

Haematological changes were studied in 36 adult male guineapigs during the period from July to December 1994. These animals were divided into six equal groups (A to F), each group consisting of six animals. Each animal of group B to F was administered with a single oral dose of crude watery extract of sheath oleander @ 300, 450, 600, 750 and 900 mg / kg body weight, respectively, whereas animals of group A which served as control. After administration of crude watery extract of ½, 6 and 72 hours a significant increase of in total erythrocyte count (TEC), total leukocyte count (TLC) and haemoglobin (Hb). The maximum increase on TEC, TLC and Hb as 35, 51 and 14%, respectively, @ 750 mg / kg body weight at 6 hr of administration of crude watery extract and the minimum value of TEC, TLC and Hb as 16, 27 and 4%, respectively, with the dose rate of 300 mg / kg body weight at the same time. The elevated haematological parameters returned to normal level within 7 days of administration.

Key words: Haematological parameters, poisoning effect, *Nerium oleander*, guineapigs

INTRODUCTION

Nerium oleander is a plant originating from the mediterranean basin and some parts of Asia. It belongs to the family Apocynaceae together with the digitalis species. Toxic principles of these plants are glycosides. *Nerium oleander* poisoning is well known in man and has been also reported in domestic and wild animals (Mahin *et al.*, 1984). The plant is highly poisonous and the milky juice which exudates from all parts of the plant contains high concentration of toxic constituents (Sandhu and Brar, 1999), 30-60g being fatal to horses, cattle or sheep. Horses have been killed by a few leaves introduced into their forage, and cattle are reputed to have died after drinking water in which leaves were floating (Myra *et al.*, 1981). The aim of the experiment is to investigate the haematological changes by the effect of *Nerium oleander* poisoning in male guineapigs.

MATERIALS AND METHODS

A total of 36 apparently healthy adult male guineapigs (*Cavia cobaya*) of nondescript breed and weighing between 700 to 900 g obtained from the Department of Microbiology and Hygiene, Bangladesh Agricultural University, Mymensingh were used in this study during the period from July to December 1994. All the guineapigs were kept under observation in order to acclimatize to the new environmental condition prior to the commencement of the experiment. All the guineapigs were maintained under good housing conditions and provided with normal feed and tap water *ad libitum*. Thirty gram fresh mature leaves of sheath oleander were collected from plant and finely grinded in a mortar and made the volume up to 300 ml. The mixture then filtered through a muslin cloth and the filtrate used as crude watery extract of sheath oleander for administration to the guineapigs. Guineapigs were randomly divided into six groups and each group comprising of 6 animals. The groups were designed as A, B, C, D, E and F. All the animals were weighed carefully and kept group-wise in 6 cases. Each animal of groups B to F were administered crude watery extract of sheath oleander in single oral doses of 300, 450, 600, 750, and 900 mg / kg body weight respectively while animals of group A served as control. Blood samples from each of the experimental animal were collected directly from the heart of guineapigs in vials contained EDTA (ethylenediaminetetraacetic acid) as an anticoagulant at ½, 6 and 72 hours, and 7 days of post administration of watery extract of oleander. Each of the collected blood sample was tested for total erythrocyte count (TEC), total leukocyte count (TLC), haemoglobin (Hb) and differential leukocyte count (only for neutrophil) as per method described by Jain (1986) and Samad (1996).

STATISTICAL ANALYSIS

All the data were analyzed statistically between controlled and treated values by using Student's 't' test (Snedecor and Cochran, 1980).

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RESULTS AND DISCUSSION

Single oral administration of crude watery extract of oleander sheath in doses of 300, 450, 600, 750, and 900 mg / kg body weight induced a significant increase in TEC, TLC and Hb in adult male guineapigs. The effect of single oral administration of crude watery extract of sheath oleander on various haematological parameters is presented in the Table 1.

Table 1. Effect of single oral administration of crude watery extract of the green leaves of *Nerium oleander* on some haematological values in adult male guineapigs

S/N	Parameters	Post-adminis- tration	Groups (n = 6)					
			A (0 mg/kg)	B (300 mg/kg)	C (450 mg/kg)	D (600 mg/kg)	E (750 mg/kg)	F (900 mg/kg)
1.	TEC (10 ⁶ /mm ³)	½ hr	5.79±0.09	6.28**±0.08 (8.46%)	6.04±0.07 (4.31%)	6.05±0.11 (4.49%)	7.39**±0.08 (27.63%)	7.61 ^b (31.43%)
		6 hr	5.67±0.08	5.65**±0.09 (15.69%)	6.93**±0.12 (22.22%)	7.13*±0.06 (25.74%)	7.68** ^c ±0.00 (35.44%)	–
		72 hr	5.75±0.04	5.75±0.07	6.10* ^a ±0.07 (6.08%)	6.74** ^b ±0.06 (17.21%)	6.68** ^c ±0.00 (16.17%)	–
		7 days	5.75±0.04	5.65±0.03	5.73 ^a ±0.09	5.74 ^b ±0.04	5.74 ^c ±0.00	–
2.	TLC (10 ³ /mm ³)	½ hr	7.15±0.06	7.37±0.09 (3.07%)	7.38*±0.05 (3.21%)	8.14**±0.05 (13.84%)	9.14**±0.04 (27.83%)	10.12** ^b ±0.06 (41.53%)
		6 hr	7.17±0.06	9.13**±0.05 (27.33%)	9.63** ^a ±0.06 (34.30%)	9.71** ^b ±0.05 (35.42%)	10.81** ^c ±0.00 (50.76%)	–
		72 hr	7.21±0.04	7.25±0.05 (0.55%)	7.51* ^a ±0.07 (4.16%)	7.55* ^b ±0.04 (4.72%)	8.27** ^c ±0.00 (14.70%)	–
		7 days	7.14±0.08	7.21±0.04 (0.98%)	7.14 ^a ±0.04	7.26 ^b ±0.03 (1.68%)	7.24 ^c ±0.00 (1.40%)	–
3.	Hb (g%)	½ hr	13.66±0.12	13.81±0.09 (1.09%)	13.70±0.08 (0.29%)	14.53**±0.07 (6.36%)	14.80**±0.06 (8.34%)	15.38** ^b ±0.00 (12.59%)
		6 hr	13.66±0.11	14.26**±0.07 (4.39%)	14.75**±0.08 (7.97%)	14.77**±0.10 (8.12%)	15.62** ^c ±0.17 (14.34%)	–
		72 hr	13.65±0.07	13.60±0.05	13.63 ^a ±0.10	14.16* ^b ±0.14 (3.73%)	14.35* ^c ±0.00 (5.12%)	–
		7 days	15.59±0.05	13.60±0.05 (0.06%)	13.57 ^a ±0.08	13.61 ^b ±0.13	13.68 ^c	–
4.	Neutrophil (%)	½ hr	35.38±0.24	35.61±0.41 (0.65%)	36.41±0.59 (2.91%)	35.71±0.36 (0.93%)	36.12±0.43 (2.09%)	35.81 ^b ±0.21 (1.21%)
		6 hr	36.12±0.28	35.59±0.31	35.78±0.37	35.59 ^b ±0.29	35.72 ^c ±0.00	–
		72 hr	36.14±0.62	36.20±0.28 (0.16%)	36.02 ^a ±0.31	36.05 ^b ±0.47	36.28 ^c ±0.00 (0.38%)	–
		7 days	35.92±0.28	36.25±0.15	36.20 ^a ±0.14	35.93 ^b ±0.28	36.17 ^c ±0.00	–

*Significant increase (p < 0.05), **Significant increase (p < 0.01), a = Mean of five animals, b = Mean of three animals, c = Value of one animal.

After 6 hr of administration of crude watery extract of sheath oleander @ 300 mg / kg body weight in guineapigs of the group B showed the elevation of TEC, TLC and Hb values : 16, 27 and 4%, respectively. Crude watery extract of sheath oleander @ 450 mg / kg body weight in group C showed an increase of TEC, TLC and Hb to the extent of 22, 34 and 8%, respectively at 6 hr of administration. An elevation of 26, 35 and 8% of TEC, TLC and Hb respectively was observed in group D receiving the dose rate of 600 mg / kg body weight at the same time. Following the administration of oleander extract @ 750 mg / kg body weight maximum increase in TEC, TLC and Hb was observed at 6 hr to the extent of 35, 51 and 14%, respectively. The peak rise to the extent of 31, 42 and 13% was observed at 30 minutes in TEC, TLC and Hb following administration of highest dose, which is 900 mg / kg body weight in group F. Schwartz *et al.* (1974) reported that the haematological and pathological changes of monkey in oleander poisoning and he also found the clinical signs were vomiting, salivation, polyuria, bradycardia, vaginal haemorrhage, abortion, anorexia, constipation, loss of body weight, narcosis, restlessness, weakness and shallow and rapid respiration. The increase in TEC may be accounted to some extent as a result of respiratory insufficiency produced in the animals poisoned with oleander extract. The increase in Hb may be the result of increase in TEC. The increase the TLC may be due to the release of leucocytes from the reservoir organs into the blood stream under the influence of the poison. In this experiment only neutrophil count was observed because of neutrophil is the first line defense mechanism and there was no significant change was observed in neutrophil count of any group of any of the doses; 300, 450, 600, 750 and 900mg / kg body weight. The elevated haematological parameters returned to normal level within 7 days of administration of oleander extract indicates that the damage, if any caused by the *Nerium oleander*.

There were minor haematological changes noticed after 30 minutes of extract administration (except 900 mg / kg body weight) which increased gradually and reached a maximally at the end of 6 hr and then decreased gradually and returned to normal level within 7 days of administration of leaves. In consonance with the time factor, the increased haematological changes were directly proportional to the doses.

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