

The effect of acute bleeding response on vital signs and some haematological values in local breed goats in An najaf province-Iraq

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Abstract

The study was carried out in An najaf province to determined the effect of two level haemorrhage(20%) on vital signs and some haematological values in local breed goats in An najaf province. The results showed that the animals of both treated groups had higher rectal temperature ,respiratory rate and heart rate in compared to animals of control group, the responses were more marked in 20% level of haemorrhage. Also the treated groups had lower red blood corpuscles , packed cells volume ,hemoglobin concentration and total leukocytes count in compared with animals in control ; they were significantly lower with 20% level of haemorrhage compared to control. The ratio of neutrophils and lymphocytes was changed in treated group, percentage of neutrophils was high whereas the lymphocytes was lower in compared with control.

Introduction

The goat are used for different purpose ,including meat production ,fiber production ,milk production and skin for leather marketing, they are unique in their ability to adaptation in harsh tropical conditions, as well as its relatively resist the diseases and dehydration (1).The main specialty uses of goats are commercial production of antibodies and animal experimentation ,particularly as model of ruminant digestion(2).The goats may suffering from considerable blood loss during surgery or parturition or after

infested with internal parasite and blood sucking insects, all these factors may lead to anemia which decreased the productivity of goat(3).Furthermore ,hematological investigation into responses of mammals to bleeding provide useful information could be utilized in medicine ,surgery and immunology. For all the above, the present study was designed to determine acute hemorrhagic responses including vital signs and some competent of blood picture in local breed goats.

Materials and methods

Animals and management :

The present study was conducted in September 2010 in private goat farm at An najaf province. Twelve young goats aged about 6 month and weighing approximately 9 kg were kept in isolated semi-closed pen .During 1 month of adaptation ,all animals were fed alfalfa and were offered tap water *adlib.*, after adaptation period the animals were distributed into 3 equal groups. control group, groups 2 and 3 were subjected as 10% and 20% of bleeding levels.

Bleeding and blood sampling

After estimation of total blood volume according to (4),the bleeding was carried out by venipuncture of jugular vein with needle G18 connected to rubber tube ,the wanted volume of blood was measured

in graduated glass cylinder. Blood samples for blood analysis were collected by special vacutainer with vacuum tubes containing EDTA . The collected blood samples were stored at 4C^o until laboratory examination.

Animals following up :

All animals were followed up immediately before bleeding ,then they were closely observed during 1st ,2nd ,3rd ,4th ,5th ,6th ,12th ,24th and 48th hour after bleeding . In each following up visit, the vital signs, including rectal temperature ,heart rate and respiratory rate were checked as described by (5) .In addition to blood sampling for laboratory examination as described above. All clinical and laboratory data were recorded in special cards.

Blood analysis :

The red corpuscular count (RBCs), hemoglobin concentration (Hb), packed cells volume (PCV) , total leukocytes

count (TLC) and differential leukocytes count (DLC) were determined in laboratory according to (6).

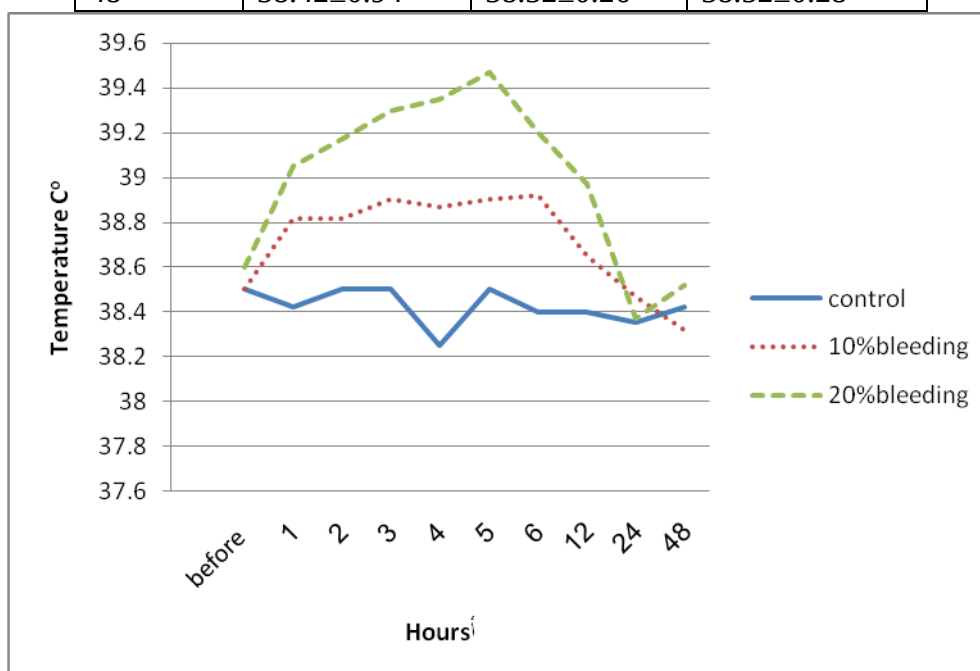
Results**body Temperature :**

Before bleeding ,the means of rectal temperature of all groups were similar. During experimental period the means of control group were nearly same(range :38.35-38.5C^o),while in treated groups the

means elevated gradually to reach the maximum at 5th hour then decline gradually to reach normal value at 24th hour of experiment as presented in table(1) ,figure(1).

Table(1) reveal the effect of bleeding on goat's body temperature (C^o)

horus	Control(mean ± SE)	Group1(mean ± SE)	Group 2(mean ± SE)
Before	38.5 ±0.21	38.5±0.25	38.6 ±0.37
1 st	38.42±0.54	38.82±0.41	39.05±0.15
2 nd	38.5±0.32	38.8 2±0.74	39.17±0.96
3 rd	38.5±0.81	38.9±0.19	39.3±0.23
4 th	38.25±0.48	38.87±0.68	39.35±0.47
5 th	38.5±0.22	38.9±0.80	39.47±0.21
6 th	38.4±0.83	38.92±0.14	39.2±0.25
12 th	38.4±0.11	38.65±0.10	38.97±0.30
24 th	38.35±0.35	38.47±0.39	38.37±0.17
48 th	38.42±0.94	38.32±0.26	38.52±0.28



Figure(1) reveal the effect of bleeding on goat's body temperature (C^o)

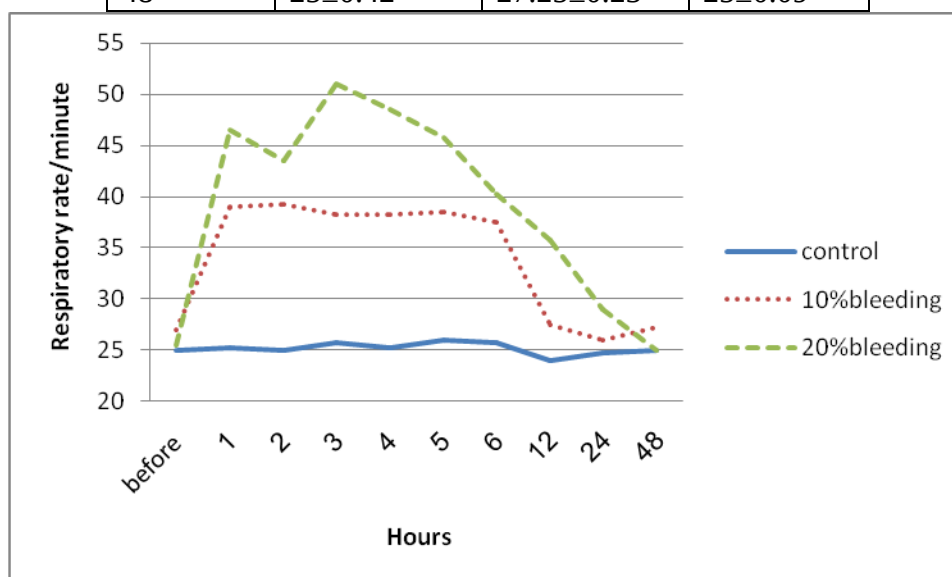
Respiratory Rate :

Table(2),figure (2) reveal that the means of respiratory rate of control group were fluctuated slightly around 25 cycle /minute (range:24-25.75 /minutes) ,while in group 1 and 2 the means were increased

gradually to reach the maximum at 5th hour and 3rd hour respectively , then it subsided to reach the normal value at end of experiment, as demonstrated in table (2) ,figure(2).

Table(2) reveal the effect of bleeding on goat's respiratory rate (cycle /minutes)

hours	Control(mean ± SE)	Group1(mean ± SE)	Group 2 (mean± SE)
Before	25 ±0.19	27±0.65	25.5±0.34
1 st	25.25±0.71	39±0.79	46.5±0.11
2 nd	25±0.67	39.25±0.15	43.5±0.98
3 rd	25.7±0.11	38.25±0.53	51±0.63
4 th	25.25±0.43	38.25±0.91	48.5±0.29
5 th	26±0.25	38.5±0.88	45.75±0.69
6 th	25.75±0.44	37.5±0.83	40.25±0.31
12 th	24±0.94	27.5±0.05	35.75±0.07
24 th	24.75±0.72	26±0.33	29±0.72
48 th	25±0.42	27.25±0.23	25±0.09



Figure(2)represent the effect of bleeding on goat's respiratory rate (cycle /minutes)

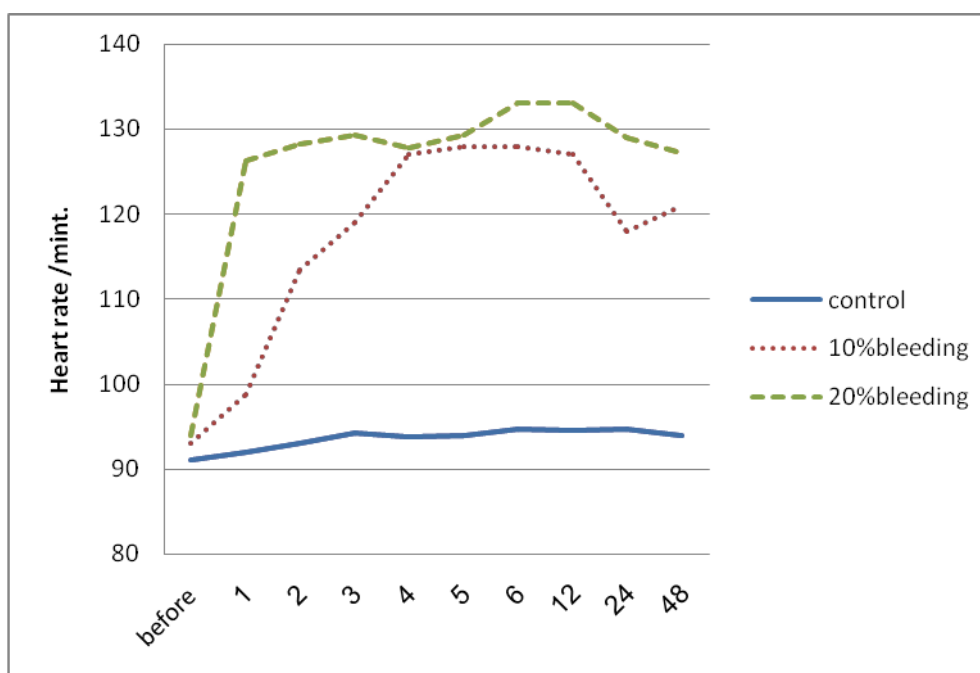
Heart rate :

Table(3) and figure(3) reveal that the means of heart rate of animals in control group were ranged from 91 to 94.75 beat/minute. In animals of group its elevated gradually to reach the maximum

value (128/minute) at 5th hour and it was 121 at end of experiment, while in animals in group 2 the means were elevated to reach maximum (133/minute) at 6th hour and still elevated to end of experiment (127.25/minute).

Table(3) reveal the effect of bleeding on goat's heart rate (beat /minutes)

hours	Control(mean ±SE)	Group 1 (mean ±SE)	Group2 (mean ±SE)
Before	91±0.18	93±0.59	94±0.86
1 st	92±0.56	98.75±0.77	126.25±0.84
2 nd	93±0.87	113.5±0.72	128.25±0.92
3 rd	94.25±0.16	119±0.22	129.25±0.61
4 th	93.75±0.34	127±0.25	127.75±0.49
5 th	94±0.97	128±0.39	129.25±0.86
6 th	94.75±0.66	128±0.85	133±0.24
12 th	94.5±0.12	127±0.39	133±0.55
24 th	94.75±0.39	118±0.11	129±0.97
48 th	94±0.45	121±0.04	127.25±0.22



Figure(3)reveal the effect of bleeding on goat's heart rate (beat /minutes)

Red corpuscles (RBC) count :

The means of RBC count of control group animals were at steady level, which ranged from $11.52-11.8 \times 10^6$, while in group 1 it was decreased immediately after bleeding to reach the minimum value (7.87×10^6) at 12th hour. In animals of group 2, the initial value of RBC count was 8.47×10^6 and its decline to minimum value (7.3×10^6) at 5th hour, table(4) and figure(4).

Hemoglobin :

Table(4), figure (5) reveal that the means of the Hb concentration in animals of control group were fluctuated and ranged from 9.87 to 10.3 g/dl in animals of group 1, the means were slightly decreased to reach the minimum value (9.87 g/dl) at

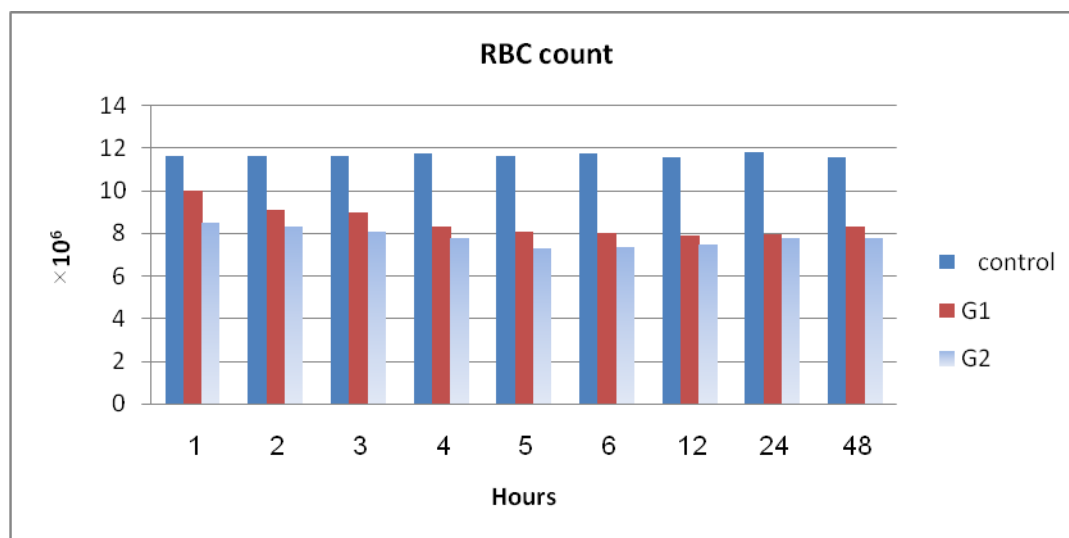
12th hour, while in the animals of group 2 the means were sharply declined to reach the minimum value (5.6 g/dl) at 5th. In both treated groups the means of Hb concentration at the end of experiment (48th hour) were subnormal.

Packed cell volume (PCV) percentage:

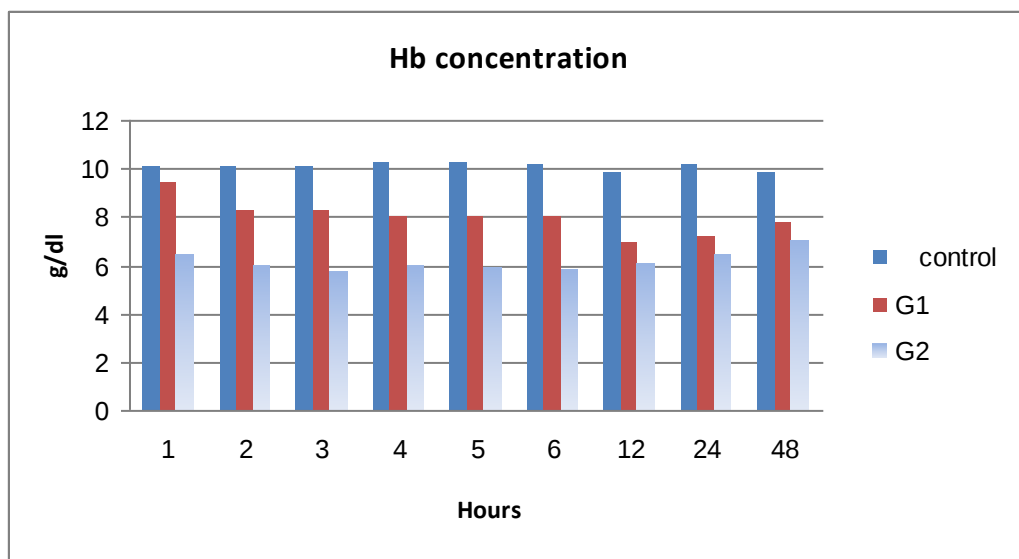
The means of control group were almost in steady level and ranged between 26 to 27 % during entire experimental period. In animals of group 1, the means were slightly decreased slightly to reach the minimum value (21%) at 4th hour, while there were gradually decreased to reach minimum value (16.5%) at 5th hours and the value still in subnormal until the 48th hour. Table(4) , figure(6) .

Table(4) demonstrate the effect of bleeding on RBC ,HB and PCV

Hours	RBC($\times 10^6$) ($\pm$ SE)			Hb (g/dl) ($\pm$ SE)			PCV(%) ($\pm$ SE)		
	contro l	G1	G2	contro l	G1	G2	control	G1	G2
1 st	11.62 $\pm$ 0.24	10.9 5 $\pm$ 0. 66	8.47 $\pm$ 0.9 2	10.12 $\pm$ 0.31	9.42 $\pm$ 0.33	6.42 $\pm$ 0.9 9	26.25 $\pm$ 0.25	24 $\pm$ 0.25	20.25 $\pm$ 1.37
2 nd	11.57 $\pm$ 0.11	9.0 $\pm$ 0.3 0	8.3 $\pm$ 0.41	10.07 $\pm$ 0.56	8.3 $\pm$ 0.73	5.92 $\pm$ 0.66	26.75 $\pm$ 0.38	22.5 $\pm$ 0.22	19 $\pm$ 0.07
3 rd	11.6 $\pm$ 0.33	8.97 $\pm$ 0.8 1	8.1 $\pm$ 1.74	10.1 $\pm$ 0.29	8.25 $\pm$ 0.0 3	5.72 $\pm$ 0.9 3	26.5 $\pm$ 0 .57	21.25 $\pm$ 0.04	18.5 $\pm$ 0.97
4 th	11.7 $\pm$ 0.91	8.27 $\pm$ 0.0 3	7.75 $\pm$ 0.1 4	10.27 $\pm$ 0.54	8.05 $\pm$ 0.4 3	6 $\pm$ 0. 39	26.25 $\pm$ 0.23	21 $\pm$ 0.6 3	18.25 $\pm$ 0.25
5 th	11.62 $\pm$ 0.18	8.07 $\pm$ 0.2 7	7.3 $\pm$ 0.17	10.3 $\pm$ 0 .08	8.02 $\pm$ 0.1 6	5.7 $\pm$ 0.36	26.5 $\pm$ 0 .52	22.5 $\pm$ 0 .15	16.5 $\pm$ 0.93
6 th	11.7 $\pm$ 0.36	8 $\pm$ 0. 39	7.37 $\pm$ 0.0	10.17 $\pm$ 0.35	8.02 $\pm$ 0.2 5	5.9 $\pm$ 0.76	26 $\pm$ 0.4 8	25.5 $\pm$ 0 .12	16.5 $\pm$ 0.046
12 th	11.55 $\pm$ 0.32	7.87 $\pm$ 0.0 5	7.47 $\pm$ 0.3 5	9.87 $\pm$ 0 .63	6.97 $\pm$ 0.6 4	6.07 $\pm$ 0.5 7	26.25 $\pm$ 0.64	25 $\pm$ 0.25	17.75 $\pm$ 0.31
24 th	11.8 $\pm$ 0.23	7.95 $\pm$ 0.5 1	7.77 $\pm$ 0.4 8	10.17 $\pm$ 0.27	7.2 $\pm$ 0.11	6.45 $\pm$ 0.2 1	27 $\pm$ 0.3 4	24.5 $\pm$ 0 .77	18.25 $\pm$ 0.38
48 th	11.52 $\pm$ 0.33	8.27 $\pm$ 1.1 2	7.75 $\pm$ 0.1 6	9.87 $\pm$ 0 .55	7.75 $\pm$ 1.8 2	7 $\pm$ 0. 88	26.5 $\pm$ 0 .95	24 $\pm$ 1.6 1	21.75 $\pm$ 0.42



Figure(4) reveal the effect of bleeding on RBC count in control and treated groups



Figure(5) reveal the effect of bleeding on Hb concentration in control and treated groups

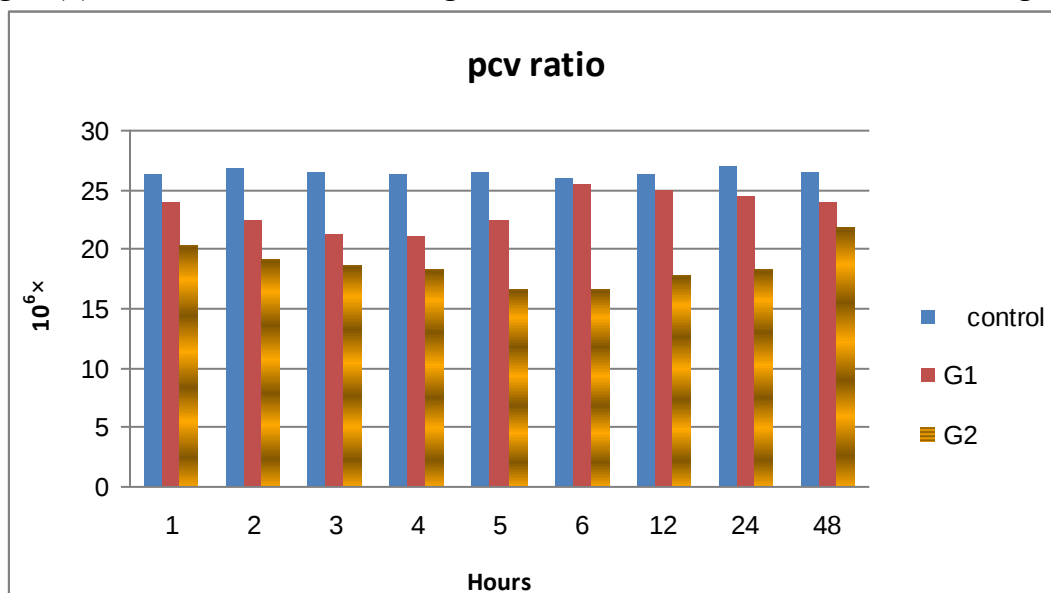


Figure (6) reveal the effect of bleeding on PCV ratio in control and treated groups

Total leukocytes count (TLC)

The control group showed fluctuating pattern during the study period, the means of TLC were ranged from 9.32×10^3 to 10.7×10^3 . In group 1, the means of TLC were decreased slightly and ranged from 8.05×10^3 to 9.45×10^3 , while in group 2 the decline was more obvious and the means was ranged from 7.32×10^3 to 8.35×10^3 as shown in table 5.

Table(5) reveal the means of TLC($\times 10^6$) in control and treated groups

Hours	Control	Group 1	Group 2
1 st	10.4	9.45	8.17
2 nd	10.22	9.25	7.5
3 rd	9.42	8.475	7.32
4 th	10.7	8.125	7.5
5 th	10.42	8.05	7.32
6 th	9.72	8.1	7.35
12 th	9.35	8.5	7.97
24 th	10.15	9	8.1
48 th	9.87	10.425	8.35

Differential leukocytes count (DLC)**Control group :**

Table(5) reveal that the means of DLC competent of control group were slightly fluctuated and the range of

lymphocytes ,neutrophils ,monocytes and eosinophils were 57.75-60.5% ,37.25-39.75% ,1.5-2.5% and 0-0.5% respectively.

Table(6) reveal the DLC ratios of control group during study period

Hours	Lymphocytes	Neutrophils	Monocytes	Eosinophils
1 st	58.5	39.25	2	0.25
2 nd	59	39	1.5	0.5
3 rd	58	37.5	2.25	0.25
4 th	60.5	37.5	2	0
5 th	60	37.25	2.5	0.25
6 th	58.25	38.5	2.25	0
12 th	58.25	39.75	2	0
24 th	58.75	39.5	1.5	0.25
48 th	57.75	39.75	2.25	0.25

Group1 (10% bleeding)

Table 6,represent the effect of 10% bleeding on DLC competent ,the lymphocytes were decreased gradually to minimum value (46%) at 4th hour then increased to reach 48.25% at 48th hour. In

contrast to lymphocytes ,the neutrophils were markedly increased to reach the maximum value (53.75%) at 4th hour the started to decline to reach 48.25% at end of experiment. The monocytes were decreased and ranged from 0-0.5%.

Table(7) reveal the DLC ratios of group 1(10%bleeding) during study period

hours	lymphocytes	neutrophils	monocytes	Eosinophils
1 st	50.25	49.25	0.5	0
2 nd	48.5	51	0.5	0
3 rd	47.25	52.75	0	0
4 th	46	53.75	0.25	0
5 th	47	53	0	0
6 th	48	52	0	0
12 th	46	54	0	0
24 th	48.25	51.5	0.25	0
48 th	51.25	48.25	0.5	0

Group 2(20% bleeding)

Table(7) reveal the effect of 20% bleeding on the DLC,the lymphocytes were sharply decreased and reached the minimum value(43.5%) then slightly

recovered to reach 46.25% at 48th hour. The neutrophills were gradually increased to 56.5% at 4th hour then decreased to 53.75% at 48th hour, while the monocytes were ranged between 0 to 0.25%.

Table(8) reveal the DLC ratios of group 2(20% bleeding) during study period

hours	lymphocytes	neutrophils	monocytes	Eosinophils
1 st	44.5	55.25	0.25	0
2 nd	44.75	55	0.25	0
3 rd	44	56	0	0
4 th	43.5	56.5	0	0
5 th	45.5	54.5	0	0
6 th	44	56	0	0
12 th	44.75	55.25	0	0
24 th	44.5	55.25	0.25	0
48 th	46.25	53.75	0	0

Discussion

The results of present study showed that the rectal temperature was elevated slightly during first day after bleeding in both treated groups. The post hemorrhage pyrexia may be due to increase of total peripheral resistance in order to maintaining the normal blood volume as well as to effect of calorogenic hormones which usually secreted after hemorrhage (7,8). The respiratory rate in associated heart rate were significantly increased after hemorrhage in animals of both treated groups, these findings were not surprised. Hyperventilation occur as main physiological responses to hemorrhage. The respiratory center is very sensitive to elevated level of hydrogen ions which elevated due to decrease capacity of oxygen carriers (RBCs), these results were in agreement with findings of others (7,9). The data in table 4 demonstrated the effect of two hemorrhage levels on some erythron parameters including RBCs count, Hb and PCV. All these parameters were decreased after bleeding to reach the minimum value at first few hours with significant variation between 10% and

20% bleeding groups. The progressive decline in these parameters was due to erythrocytes storage activity of spleen(), then the decline in these parameters were related to haemodilution induced by flux of interstitial fluid (8,10). In same manner, the total leukocytes count (TLC) decreased in hemorrhaged animals (table 5) with less immediate changes, this fact indicate that mobilization of blood volume from spleen to circulation as result to splenic contraction. The bleeding in treated animals resulted in an increase in neutrophils ratio associated with decrease in lymphocytes ratio (table 6). The post bleeding neutrophillia is related to releasing of epinephrine as bleeding response, which shifting the neutrophils from marginal pool and bone marrow reserve to circulation (11). The observed lymphocytosis in treated animal could be attributed to release of ACTH or cortisol which usually increased after hemorrhage (8). ACTH induces dissolution of lymphocytes in tissue and increase in antibody concentration in blood (12).

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تأثير الاستجابة الحادة للنزف على العلامات الحيوية وبعض المعايير الدموية في الماعز المحلي في منطقة النجف

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الخلاصة

اجريت الدراسة لتحديد تأثير مستويين من النزف على العلامات الحيوية وبعض المعايير الدموية في الماعز المحلي في محافظة النجف. اظهرت النتائج وجود ارتفاع في معدل درجات الحرارة ومعدل التنفس ومعدل نبضات القلب في المجموعتين المعاملتين مقارنة مع مجموعة السيطرة، وكانت الاستجابة أكثر وضوحاً في مستوى نزف 20% كما أوضحت النتائج وجود انخفاض في عدد خلايا الدم الحمراء وحجم الخلايا المرصوص وتركيز خضاب الدم وعدد الخلايا البيضاء في المجموعتين المعاملتين مقارنة مع مجموعة السيطرة، وتبين وجود ارتفاع في نسبة الخلايا العذلة الى الخلايا اللمفية في المجموعتين المعاملتين حيث تميزت بارتفاع نسبة العدلات مع انخفاض في نسبة الخلايا اللمفية مقارنة مع مجموعة السيطرة.