Adverse effects of Diclofenac Potassium and Dexamethason on some hematobiochemical and immunological parameters in Egyptian goat bucks

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Abstract: Fifteen, 4-8 months old goats were used to study the effect of diclofenac potassium and dexamethasone on some hematobiochemical parameters, as well as immunity. Animals were divided into 3 groups (5 buck each) 1st group was left without treatment as control while 2nd and 3rd groups were treated by diclofenac potassium (1.1 mg/kg b.wt.) and dexamethasone (0.20 mg/kg b. wt.) respectively as therapeutic dose for 5 successive days. Two blood samples were collected from on 1st, 7th and 14th days after the last injection of both drugs for leukogram and biochemical analysis. The results revealed that, diclofenac potassium and dexamethasone induced significant increase in total leucocytic count, neutrophil, monocyte, basophil, esionophil, ALT, AST, urea and creatinine, calcium, potassium and inorganic phosphorus, beside significant decrease in lymphocyte, total protein, albumin, globulin ALP and sodium also significant decrease in in RBCs, Hb, PCV, IgA, IgG, IgM, on the 1st. and 7th after the last injection was recorded. It could be concluded that both diclofenac potassium and dexamethasone induced several hematobiochemical and immunological changes as well as the adverse effects of diclofenac potassium were completely reversible within 14 days while they were incompletely reversible within 14 days with dexamethasone.
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1. Introduction

Anti-inflammatory drugs are steroidal and non-steroidal (Lee and Katayama, 1992). Non steroidal anti-inflammatory drugs (NSAIDs) are most prescribed drugs in human and veterinary medicine that provide anti-inflammatory, antipyretic, analgesic, antispasmodic, and anticoagulant effects. Diclofenac (2-(2,6-dichloranilino) phenylacetic acid), a phenylacetic acid derivative NSAID, is one of the most frequently prescribed nonselective NSAIDs worldwide, and it has strong analgesic, antipyretic, and anti-inflammatory effects. It is believed that diclofenac shows its action via inhibition of prostaglandin synthesis by inhibiting cyclooxygenase (COX) and lipoxygenase enzyme pathway. Intravenous, intramuscular, oral, suppository, transdermal patch, and gel forms of diclofenac are available in markets for human and veterinary medicine. It is commonly used to treat bone-muscle traumas, osteoarthritis, rheumatoid arthritis, ankylosing spondylitis, colic, and infectious hyperthermia (Kaya et al., 2002; Tras and Elmas, 2012). Non-Steroidal anti-inflammatory drugs (NSAIDS) act by inhibition of cyclooxygenase enzyme (Cox) which leads to a decrease in synthesis of various prostaglandins and thromboxanes (Taylor et al., 1994) Among the NSAIDS, diclofenac is the widely available veterinary drug (Shultz, 2004). Diclofenac a phenylacetic acid is widely used in human and veterinary practice (Ramesh et al., 2002). Diclofenac Potassium is a benzeneacetic acid derivative. It is 2-[(2, 6-dichlorophenyl) amino] benzene acetic acid, mono-potassium salt (Abatan et al., 2006). Diclofenac potassium is an inhibitor of (Cox) and acts by decreasing the free arachidonate level (Goodman and Gilmans, 2001). Steroidal anti-inflammatory is the most important and often lifesaving class of potent anti-inflammatory agent in the treatment of several conditions (Yeates and March, 1980). Steroidal anti-inflammatory also used in treatment of adrenal hormone deficiency (Goodman and Gilmans, 2001), Dexamethasone is one of the common synthetic steroidal antinflammatory. Most NSAIDs are acidic compounds with a relatively high bioavailability. They are highly bound to plasma proteins and are metabolized by the liver (Harirforoosh et al., 2009; Knights et al., 2009). Glucuronidation by the kidney enzyme is also reported for some NSAIDs (e.g., naproxen, ibuprofen, ketoprofen) (Knights et al., 2009; Ritter, 2000). Most patients take therapeutic doses of these drugs for short durations and, usually, tolerate them well (Bennett et al., 1996). The gastrointestinal (GI), renal and cardiovascular (CV) side effects limit NSAIDs use (Essex et al., 2013). Uses of NSAIDs have relatively little effect on the kidney because of low renal production of prostaglandins. However, in the presence of renal hypoperfusion in which local synthesis of vasodilator prostaglandins is increased to protect the glomerular hemodynamics and to maintain

appropriate renal tubular transport of fluid and electrolytes, inhibition of prostaglandin synthesis by NSAIDs can lead to vaso-constrictive acute renal failure as well as fluid and electrolyte disorders such as sodium retention and resistance to diuretics, hyponatremia and hyperkalemia (Wen, 1997). NSAIDs are frequently prescribed drug group in human and veterinary medicine. However, diclofenac, a traditional nonsteroidal anti-inflammatory drug, related to cardiotoxicity is reported, and blood cardiac damage markers may increase within the first hours after damage (Er et al., 2013).The aim of the present study was to determine the effect of intramuscular injection of dexamethasone and diclofenacpotassiumon hepatic (alkaline phosphatase (ALP), alanine aminotransferase (ALT), AST, gamma glutamyltransferase (GGT), IgA, IgM, total protein (TP), albumin), renal (creatinine, blood urea nitrogen (BUN)), blood cell counts (white blood cells counts (WBC), red blood cell counts (RBC), and hemoglobin) and other biochemical parameters (Calcium, Sodium, Potassium and phosphorus).

2. Materials and Methods

2.1. Drugs

A-Diclofenac potassium (Cataflam)® is one of (NSAIDS) manufactured by Schering- plough Company. The drug is presented as ampule 3ml; each one milliliter contains 25 mg diclofenac potassium.

B- Dexamethasone is a synthetic glucocorticoid anti-inflammatory manufactured by Egyptian Co. for chemical andpharm (Adwia) 10th of Ramadan City. The drug is presented as a bottle 100 ml; each milliliter contains 2 mg dexamethasone sodium phosphate.

2.2. Experimental design

A total of 15 Egyptian goats bucks 4-8 month old were clinically healthy belonged to a special goats farm at Sharkia Governorate was employed in this investigation. Bucks were randomly divided into 3 group (5 buck each), The 1st group was injected IM with distilled water and left without treatment as control group, 2nd and 3rd groups were injected IM injection with 1.1 mg diclofenac potassium /kg b. wt. and 0.20 mg dexamethasone /kg b. wt. respectively as therapeutic dose for 5 successive days.

2.3. Haematobiochemical analysis.

Two blood samples were collected from jugular vein on the 1st, 7th and 14thdays post injection of both drugs. The 1st sample was taken in tube contain EDTA for estimation of blood picture according (Jain, 2000). While the 2nd sample was taken in centrifuge tube to obtain clear serum for estimation of total protein according (Doumas et al., 1981), protein fractions (Kaneko, 1989), transaminases (AST and ALT) (Ritman and Frankle, 1957). Immunoglobulin (IgA, IgM and IgG) were determined using SANDWICH ElISA method) Erhard et al., 1992). Serum sodium and potassium (Oser,1979), inorganic phosphorus (Goldenberg, 1966) Calcium (Glindler and King, 1972).

2.4. Statistical analysis:

For presentation of results, the means and standard errors of the mean (SEM) were calculated. Analysis of variance (ANOVA) was performed using the Statistical Analysis System software (SAS), results were considered statistically significant when ($P< 0.05$).

3. Results

3.1. Hematological parameters:

The results revealed that significant decrease in RBCs. in both groups than control one and the significant decrease in the 3rd group more than in the 2nd group from the 1st day to the 14th day after the injection as shown in Table (1),while the W.B.Cs were significantly increased in both groups than control on the 1st day till 14th day after the injection as shown in Table (2). PCV shows significant decrease in both injected groups as compared to the control on the 1st day only after the last injection while there is no significant difference between both treated groups.

There was significant decrease in the Hb level on the 1st day till 7th day after the last injection in both injected groups as compared to the control one while the decrease was more in 3rd group than 2nd group as shown in Table (1). There was significant decrease in lymphocytes in both injected groups as compared to the control one without significant difference between them while there was significant increase in neutrophils, eosinophils, basophils and monocytes in both injected groups as compared to the control one and there is no significant difference between the 2nd and 3rd group as shown in Table (2).

3.2. Immunological parameters:

There was significant decrease in IgG in both injected groups as compared to the control one on the 1st day till the 7th day and continuous decrease till the 14th day after the last injection in the 2nd group only. On the other hands, there was significant decrease on the 1st day in the 2nd group than the 3rd one while there was no significant difference between them on the 7th day after the last injection but there was significant increase in the 3rd group than the 2nd group on the 14th day. Also the result revealed that there was significant decrease IgM level in both injected groups as compared to the control one on the 1st day while there was no significant difference in the 2nd group as compared to the control one on the 7th day. On the other hand, there was significant decrease in the 3rd group as compared to the control one on the 7th day after the last injection and there was no significant

difference between the all groups on the 14th day, there was significant decrease in the3rd group than the 2nd group on the 1st and the 7th day after the last injection. The result revealed that there was significant decrease in IgA level in both injected groups as compared to the control one on the 1st and the 7th day only while there was significant decrease in the 3rd group than 2nd group on the 1st day only after the last injection as shown in Table (3).

Table (1) Effect of diclofenac potassium and dexamethasone on erythrogram of goats. (N =5 goats).

Parameter	RBCs (10^6/mm3)			Hb (g/dl)			PCV (%)		
	1d	7d	14 d	1d	7d	14 d	1d	7d	14 d
G (1)	6.37± 0.51	6.41± 0.35	6.40± 0.28	11.13± 1.31	10.93± 0.36	10.54± 0.98	23.43± 0.64	22.75± 0.49	23.04± 0.32
G (2)	5.86± 0.64	5.95± 0.53	6.16± 0.71	10.47± 1.12	10.82± 1.62	10.98± 1.81	21.28± 0.97	22.05± 0.87	22.83± 0.84
G (3)	4.54± 0.24*	4.90± 0.40*	5.69± 0.64	9.07± 0.53*	9.40± 0.16*	10.21± 0.87	20.07± 0.84*	21.08± 0.45*	22.98± 1.59

* $P< 0.05$

Table (2) Effect of diclofenac potassium and dexamethasone on leukogram of goats. (N =5 goats).

Parameter		WBCs (10^3cm.m)	Differential Leukocyte Count				
			Lymphocytes	Neutrophils	Eosinophils	Basophils	Monocytes
1d	G (1)	14.42±0.58	5.11±0.14	4.18±0.30	2.10± 0.41	1.01± 0.17	2.02± 0.23
	G (2)	16.64±0.42*	4.68±0.12*	5.07±0.23*	2.81±0.19	1.54± 0.12*	2.54± 0.16*
	G (3)	16.83±0.26**	4.55±0.20*	5.15±0.21*	2.91±0.32	1.62± 0.17*	2.60± 0.19*
7d.	G (1)	14.73±0.40	5.23±0.18	4.31±0.12	2.08±0.43	1.03±0.15	2.08±0.10
	G (2)	15.92±0.23*	4.73±0.08*	4.72±0.15*	2.61±0.13	1.50± 0.10*	2.36± 0.08*
	G (3)	16.08±0.27*	4.63±0.14*	4.81±0.19*	2.67±0.24	1.57± 0.15*	2.40± 0.08*
14 d	G (1)	14.31±0.63	5.06±0.45	4.10±0.49	2.00± 0.26	1.05± 0.18	2.10± 0.60
	G (2)	15.05±0.43	4.96±0.79	4.64±0.57	2.21± 0.30	1.09± 0.14	2.15± 0.32
	G (3)	15.12±0.38	4.91±0.57	4.70±0.55	2.18± 0.40	1.14± 0.21	2.19± 0.28

* $P< 0.05$

Table (3) Effect of diclofenac potassium and dexamethasone on immunoglobulin of goats. (N =5 goats).

Parameter	IgA (mg/ml)			IgM (mg/ml)			IgG (mg/ml)		
	1d	7d	14 d	1d	7d	14 d	1d	7d	14 d
G (1)	3.32± 0.14	3.40± 0.21	3.09± 0.19	1.96± 0.20	1.85± 0.10	1.90± 0.15	1.42± 0.10	1.48± 0.20	1.47± 0.24
G (2)	3.03± 0.19	3.16± 0.23	3.25± 0.18	1.78± 0.29	1.87± 0.31	1.97± 0.14	1.29± 0.25	1.37± 0.21	1.14± 0.13
G (3)	2.00± 0.25**	2.83± 0.11*	3.05± 0.25	1.38± 0.11*	1.40± 0.15*	1.83± 0.16	1.02± 0.12*	1.20± 0.10	1.43± 0.18

* $P< 0.05$, ** $P< 0.01$

Table (4) Effect of diclofenac potassium and dexamethasone on protein profile of goats. (N =5 goats).

Parameter		T.P	Alb	Globulin (Gm/dl)				A/G Ratio
				α	β	γ	Total	
1d	G (1)	8.43±0.28	4.06±0.61	1.40±0.13	1.36±0.10	1.61±0.20	4.37±0.32	0.93±0.12
	G (2)	6.97±0.57*	3.49±0.44	1.28±0.22	1.14±0.25	1.06±0.10*	3.48±0.17*	1.00±0.20
	G (3)	6.43±0.45*	3.28±0.50	1.04±0.06*	1.06±0.07*	1.01±0.04*	3.15±0.29*	1.04±.21
7d	G (1)	8.54±0.41	4.02±0.39	1.56±0.15	1.40±0.09	1.62±0.09	4.52±0.34	0.89±0.18
	G (2)	7.08±0.31*	3.59±0.30	1.15±0.27	1.10±0.25	1.24±0.07*	3.49±0.26*	1.03±0.21
	G (3)	7.18±0.22*	3.70±0.27	1.10±0.12*	1.12±0.07*	1.26±0.10*	3.48±0.24*	1.06±0.24
14 d	G (1)	8.17±0.52	3.99±0.49	1.40±0.17	1.18±0.23	1.60±0.26	4.18±0.62	0.95±0.42
	G (2)	7.94±0.41	3.80±0.49	1.39±0.19	1.14±0.15	1.61±0.18	4.14±0.53	0.91±0.24
	G (3)	7.80±0.62	3.80±0.31	1.38±0.28	1.15±0.19	1.47±0.25	4.00±0.39	0.95±0.19

* $P< 0.05$.

Table (5) Effect of dexamenthasone and potassium diclofane on liver enzymes of goats. (N=5 goats)

Parameter	1d			7d			14d		
	G (1)	G (2)	G (3)	G (1)	G (2)	G (3)	G (1)	G (2)	G (3)
AST (U/L)	71.64± 0.62	79.02± 1.95**	80.53± 2.14**	71.48± 1.55	80.38± 1.48*	80.13± 1.95**	70.09± 0.59	74.06± 0.37	72.40± 0.97
ALT (U/L)	16.34± 0.82	20.31± 0.94*	21.08± 0.98**	16.55± 0.58	19.24± 0.47*	20..97± 0.93**	18.29± 0.17	19.38± 0.61	18.70± 0.39
ALP (U/L)	64.55± 1.49	62.15± 1.41	61.08± 1.73	63.37± 1.67	61.97± 1.98	61.24± 1.64	63.17± 1.58	66.48± 1.93	65.30± 1.47

* $P< 0.05$, ** $P< 0.01$.

Table (6) Effect of diclofenac potassium and dexamethasone on kidney function of goats. (N=5 goats)

Parameter		Kidney function		Mineral			
		Urea (mg/dl)	creatinine (mg/dl)	Phosphorus (mg/d	Calcium (mg/dl)	Sodium (mmol/l)	Potassium (mmol/
1d	G (1)	18.28±0.46	1.68±0.13	7.49±0.19	8.41±0.43	149.10±1.73	5.54±0.43
	G (2)	20.05±0.53*	2.12±0.11*	8.23±0.22*	9.84±0.31*	141.84±1.94*	6.49±0.21*
	G (3)	21.13±0.60**	2.35±0.16**	9.05±0.16**	9.97±0.14**	140.25±2.05**	6.74±0.19**
7d	G (1)	18.84±0.18	1.73±0.08	7.34±0.10	8.12±0.26	149.53±1.03	5.78±0.28
	G (2)	19.43±0.20*	1.98±0.10*	7.97±0.17*	9.71±0.24*	144.20±1.21*	6.83±0.37*
	G (3)	20.18±0.24**	2.08±0.12*	7.99±0.14**	9.52±0.23**	143.06±1.09**	6.95±0.26**
14 d	G (1)	19.08±0.94	1.74±0.25	7.54±0.82	7.96±0.50	155.32±0.45	5.84±0.50
	G (2)	19.95±0.68	1.78±0.15	8.39±0.39	8.65±0.83	154.39±0.93	6.99±0.49
	G (3)	22.05±0.68*	1.75±0.21	8.47±0.48	8.99±0.47	155.05±0.38	6.94±0.56

* $P< 0.05$, ** $P< 0.01$.

3.3 Liver and kidney function tests

There was significant decrease in total protein and albumin levels in both injected group as compared to the control one on the 1st and the 7th day while there was no significant difference between the two groups as shown in the Table (4). Also there was significant increase in AST and ALT level in both injected groups as compared to the control one on the 1st and the 7th day after the last injection while there was significant decrease in ALP level in both injected groups as compared to the control one on the 1st day only and there is no significant difference between both injected groups as in Table (5) while there was significant increase in creatinine in both injected groups as compared to the control one on the 1st and the 7th day without significant difference between the two injected groups as shown in Table (6) while there was significant increase in urea level in both injected groups as compared to the control one with significant increase in urea level in the 3rd group than the 2nd group as shown in Table (6).

3.4 *Mineral and electrolytes:*

There was significant increase in calcium, phosphorus and potassium level in both injected groups as compared to the control one without significant difference between the two groups. On the other hand there was significant decrease in the sodium level in both injected groups as compared to the control one without significant difference between them as show in Table (6).

1. Discussion

Significant decrease of RBC_S and significant increase of WBC_S and total leucocytes count in treated group than control one and this results is not agree with (Er et al., 2013) which may be due to different dosage and stress factors of long course of the experiment. Diclofenac potassium and dexamethasone induce significant leucocytosis, neutrophilia, monocytosis and basophilia beside significant decrease in lymphocyte coupled with insignificant eosinophilia on 1st and 7th days post injection. Same results were recorded in healthy goat injected with diclofenac sodium (Ahmad et al., 2013). Also diclofenac induced same effect in leukogram (Hofer et al., 1996). Also diclofenac sodium induced significant leukocytes (El- Maddawy et al., 2013). These changes in leukogram have also been reported by (Sachs et al., 2004) when used diclofenac in humans and animals. The same change in leukogram was recorded by (Glsen et al., 2003) in rats injected with diclofenac potassium. Dexamethasone induces significant leucocytosis, neutrophilia and decrease in lymphocyte (Zia, 1992). Reduction in circulating eosinophils may be due to endogenous orexogenous increase in adrenocorticotrophic hormone (A.C.T.H.) or adrenocortical steroid (Raphal, 1976). In the current work, both injected groups had significant decrease in total erythrocytic count, hemoglobin, PCV as Diclofenac (Meyer et al., 2003) and dexamethasone (Hassan, 1998; Safarmashaei and Hasanpour, 2011) cause anaemia and changes in hemogram in post

administration, which may be due to deleterious effect of the drug on bone marrow (Yeates and March, 1980). In our study significant decrease in total protein and albumin levels in both injected groups as compared to the control one. In addition, there was significant increase in AST, ALT level in both injected groups as compared to the control one while there was significant decrease in ALP level in both injected groups as compared to the control one and there was significant increase in creatinine and urea level in both injected groups as compared to the control one. These results were in line with findings of (Basavraj et al., 2012) in Swiss albino mice injected with diclofenac sodium. Another non-steroidal anti-inflammatory (phenylbutazone) induced increase in ALT, AST, urea and creatinine level (Safarmashaei and Hasanpour, 2011).Changes in liver enzymes post using diclofenac potassium may be due to diclofenac induce hepatotoxic effects due to reduced / impaired ATP synthesis (Oaks et al., 2004). Diclofenac is associated with severe hepatic toxicity and change in liver enzymes (Tomic et al., 2008). Renal function impairment by diclofenac potassium and increased urea and creatinine has been documented in rabbits (Syed et al., 2012). Also, diclofenac sodium induced a significant increase in AST and ALT, urea and creatinine levels (El- Maddawy et al., 2013). Also, this disturbances of kidney and liver function tests achieved by the used drugs may be due to it has serious side effects such as gastrointestinal ulceration or bleeding, liver and kidney damage, allergic reactions, myocardial infarction, and cardiac sudden death (Gan, 2010; Hermann, 2009) as well as increase in ALP and AST may be attributed to cardiovascular side effects of diclofenac, which may myocardial damage or infarction which may be related to inhibition to Cox synthesis (Er et al., 2013) and increase some of markers of cardiac damage (Er et al., 2013; Hermann, 2009; Krotz and Struthmann, 2010; Ray et al., 2009; Yazar et al., 2001), as well as significant increase of liver function (ALT,AST) may be attributed to damaging effect of NSADS on the liver (Er et al., 2013). Therefore measuring of AST and ALT may be beneficial during NSADS treatment (Gan, 2010; Hersh et al., 2000; Tras and Elmas, 2012). The present investigation revealed that diclofenac ppotassiuminduced significant decrease in IgA, IgG and IgM. Dexamethasone show significant decrease in IgA, IgG, IgM, on 1st& 7th post injection. This observation was previously recorded by (Abd El. Aliem, 1999; Fayed and Korshom, 1998). These results may be due to decrease in total protein and globulin as suggested (Lees and Higgins, 1985). Analysis of protein profile of the healthy goat bucks injected with diclofenac potassium showed significant decrease in alpha globulin; beta globulin, meanwhile, diclofenac potassium and dexamethasone induced significant decrease in total protein, gamma globulin, total globulin beside insignificant decrease in albumin. Meanwhile, dexamethasone induce significant decrease in alpha globulin; beta globulin on 1st and 7th post injection. Similar findings were previously recorded by (El- Maddawy et al., 2013) which showed that diclofenac sodium evoked a significant decrease in serum total proteins, albumin and total globulins.Dexamethasone induces significant decrease in serum protein in goats (Fayed and Korshom, 1998).These results agreed with those obtained by (Hefney, 1996) who reported that another glucocorticoids (Depo-Modrol (methylpredinsone acetate) and kenacorte) resulted in significant decrease in serum total protein rabbits. Decrease in protein in goats injected with dexamethasone may due inhibition in protein synthesis through decrease synthesis of messenger R.N.A. in fibroblast, DNA synthesis is impaired directly by corticosteroids (Kayali et al., 1987). A change in the balance between COX-1 and COX-2 activities in the body has been suggested to influence, at least in part, the adverse effects including GI complications, reduced renal output, bleeding disorder and cardiogenic events (Meade et al., 1993).Significant increase in calcium, phosphorus and potassium level, While significant decrease in the sodium level in both group than control one may be due to an ion channel hypothesis has been postulated suggestive of a Ca++ induced K+ channels to be the target of most NSAIDs for their side effects (Harirforoosh et al., 2013). Various forms of renal failures caused by NSAIDs have been observed including acute deterioration of renal function, renal papillary necrosis, acute interstitial nephritis, hyperkalemia and sodium and fluid retention (Breyer and RC., 2001; Whelton and Hamilton, 1991). In addition, the results of this study may be attributed to through a set of animal studies, we have observed that the electrolyte retention property of NSAIDs is not dependent upon their COX selectivity (Harirforoosh and Jamali, 2005) but is influenced by their tendency to accumulate in the kidney tissues (Harirforoosh et al., 2006). Meloxicam and celecoxib have approximately the same degree of COX selectivity but only the latter cause's electrolyte retention. Hyperkalemia which may be secondary to potassium retention can be diagnosed with an initial serum potassium concentration of $\geq$ 6 mEq/L in outpatient setting or within the first 48 h of hospitalization (Lafrance and Miller, 2012). It is well known that aldosterone increases the potassium excretion. Since PGI2 stimulates the juxtaglomerular cells in the kidney to release renin (Stichtenoth and Frolich, 2000) and consequently aldosterone (Brater, 1999), an inhibition of PGI2 production by NSAIDs may result

in hyperkalemia (Stichtenoth and Frolich, 2000). In addition, Sodium retention that occurs in 25% of patients exposed to NSAIDs (Palmer, 1995) causes oedema and weight gain (Schwartz et al., 2002). NSAID-induced sodium retention may be the result of increases in the expression of the Na-K-2Cl co-transporter (Fernandez-Llama et al., 1999) which plays a role in excretion of sodium and maintaining the GFR (Breyer and RC., 2001), as shown in our study which may be due to all major prostanoids including PGD2, PGE2, PGF2α, PGI2, and thromboxane A2 are synthesized in the kidney (Antonucci et al., 2009). Both PGE2 and PGI2 are important in renal function (Claria, 2003). PGE2 which is located in nephrons, the renal medullary interstitial cells and the collecting tubules, is a vasodilator and plays a major role in excretion of salt and water by the kidney.Due to the effect of NSAIDs on inhibition of the formation of such mediators so the adverse effect of NSAIDs on the kidney lead to disturbances in the kidney functions as urea and creatinine concentrations (Lameire et al., 2005) as well as some salts as sodium, potassium, calcium and phosphorus as the results of this work show that the most side effects are reversible after 14 day of the last dose. This study revealed dexamethasone and diclofenac potassium induces significant increase in calcium, potassium and inorganic phosphorus beside significant decrease in sodium. Our results were reinforced with that (El-Seidy et al., 2002; Maddux et al., 1988) mentioned that dexamethasone induced hypo-kalaemia, hypophosphatemia, and hyperglycaemia in goats. Also, (Hickey et al., 2001) and (Syed et al., 2012) stated that diclofenac is a powerful nephrotoxicant and increase calcium, potassium and inorganic phosphorus beside significant decrease in sodium level in mice. Adverse effect in hemato-biochemical parameters induced by dexamethasone was severe and very mild for diclofenac potassium. These alterations were reversible as it's returned to nearly normal levels at 14^{th} day post treatment and these results agree with those of (Radford et al., 1996).

2. Conclusion.

According to the result of this study, we can concluded that both diclofenac potassium and dexamethasone induced several hematobiochemical and immunological changes in the goat bucks.Side effects of diclofenac potassium on [IgA, phosphorus, sodium, potassium, calcium, AST, PCV, Hb, creatinine and ALP] were disappeared after 7 days from the last dose of the drug and the other parameters were disappeared after 14 days after the last dose of the drug. While the side effect of dexamethasone on [IgM, IgG, sodium, total protein, album, lymphocytes, basophil, eosinophil, PCV, Hb, creatinine, ALP and ALT] disappeared after 14 days of the last dose of injection of the drug. The other parameters still disturbed more than 14 days. Therefore, that diclofenac potassium is safer because it is less hazard than dexamethasone.

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