



## **Efficacy of Parenteral Kanamycin - Colistin Mixture in Treatment of Contaminated Wounds in Local Breed Donkeys**

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### **Abstract:**

This study was conducted on donkeys in Al-Najaf city in university of kufa /college of veterinary medicine during January /2017 till February /2017 to evaluate the effect of (Kacolis®) Fivevet/vietnam (kanamycin and colistin mixture) in treatment contaminated wounds in donkeys, and observe of the clinical features, blood picture and levels of some enzymes in the serum.

In this study five donkey treated with the drug as affected group and three donkeys as control group treated with normal saline, and blood samples were collected from each one to estimate blood picture and serum enzymes concentration. The clinical examination of treated donkeys was showed normal heart and respiratory rates and body temperature while in control group which showed increase in heart, respiratory and temperature. The results of hematological picture of control and treated donkey group show non significant differences between of them except the neutrophile cell number which appear increase in control group than treated animals. Serum alanin transefers eenzyme concentration was (15±0.43)U/L, urea (25.3 ±0.3 mg/dl) and creatinin (1.3±0.031 mg/dl) in treated donkey within normal valeus, and the result of control donkeys were (14.6±0.13) U/L, (24±0.5 mg/dl) and (1.24±0.02 mg/dl) respectively.

**Keywords:** kacolis, donkeys, Clinical features, Al-Najaf

### **فعالية علاج خليط الكاناميسين - كوليسيتين بالحقن في علاج الجروح الملوثة في الحمير المحلية**

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### **الخلاصة:**

اجريت هذه الدراسة في محافظة النجف الاشراف حفل كلية الطب البيطري جامعة الكوفة خلال الفترة من 15 من شهر كانون الثاني 2017 لغاية يوم 15 من شهر شباط / 2017 لغرض معرفة مدى امكانية استخدام علاج Kacolis والذي هو مزيج من مادة الكاناميسين سلفيت ومادة الكولستين والفييتنامي المنشأ في الجروح الملتئمة في الفصيلة الخيلية. ومن خلال متابعة التغيرات في العلامات السريرية والفحوصات الفيزيائية والصورة الدموية وكذلك من خلال معرفة نسبة تركيز انزيم ALT وتركيز الكرياتينين واليوريا في مصل الدم

شملت الدراسة ثمانية حمير خمسة منها عوملت بمادة **Kacolis** كمجموعة معالجة متلوثة الجروح وثلاثة عوملت بالماء المقطر كمجموعة سيطرة أيضا متلوثة الجروح وجمعت عينات الدم منها لغرض اكمال الفحوص . ولم يظهر الفحص السريري في الحيوانات اختلافات كبيرة وكذلك الصورة الدموية لم تبدي تغيرات ملحوظة باستثناء عدد خلايا الدم البيضاء في مجموعة السيطرة ( $0,2 \pm 13,9$ ) (اقل مما في مجموعة المعالجة ( $0,188 \pm 11,4$ ) وبسبب ارتفاع نسبة خلايا العدلة والمفاوية فيها. كان تركيز انزيم ALT والكرياتينين واليوريا في مجموعة المعالجة ( $15,6 \pm 0,43$ ) ( $\text{Mg/dL } 0,30 \pm 1,3$ ) و ( $\text{Mg/dL } 0,3 \pm 25,3$ ) على التوالي مقاربا الى مجموعة السيطرة ( $14,6 \pm 0,13$ ) ( $\text{Mg/dL } 0,02 \pm 1,24$ ) ( $\text{Mg/dL } 0,5 \pm 24$ ) على التوالي. ولم يظهر أي تثخن في منطقة الحقن في عضلة الرقبة في مجموعة المعالجة و مجموعة السيطرة

**الكلمات المفتاحية:** العلامات السريرية, الفحوصات الدموية والكيميائية, الحمير, الكاكوليس النجف الاشرف.

### Introduction:

Kanamycin is an aminoglycoside antibiotic produced by the growth of *Streptomyces kanamyceticus* (1). Kanamycin is intended for intramuscular, intramammary or subcutaneous administration in animals, like other aminoglycoside, kanamycin exerts a bactericidal action through inhibition of bacterial protein synthesis and reduction of translation fidelity at ribosomal level (2). Colistin is a cyclopeptide antibiotic producing by culture of *Bacillus polymyxin var, colistinus*, it belongs to the polymyxin therapeutic (3). Colistin is used for the prevention and treatment of disease caused by the sensitive bacteria in rabbits, pigs, poultry, cattle, sheep and goats, its usually administered orally, as drench or in the feed, drinking water or milk replace diet (4). Colistin Sulphate was of moderate to low acute oral toxicity, but was of higher acute toxicity when administered parenterally (5). Colistin is only used orally in veterinary medicine, and it has been demonstrated that it undergoes virtually no systemic absorption, partly due to its high molecular weight (about 1100 Daltons) (3). The polymyxin group of antibiotics to which colistin belongs were replaced by other antibiotics in the 1970s as a result of concerns about nephro- and neurotoxicity (6). Poor

absorption of colistin from the intestines precluded toxicity problems in animals (7). Despite the company did not remember use the drug (kacolis) in equine.

### Materials and methods:

#### Experimental design

Eight donkeys divided into two group, the first include five donkeys as treated contaminated wounds group and administrated by kanamycin, colistin mixture (**kacolis<sup>®</sup>**) Fivevet /vitname which is in the neck muscle in dose rate 1 ml /7 kg body weight twice a day for five consecutive days, and three donkeys as control contaminated wounds group injected by normal saline, in both groups after induce contaminated wounds by incision in the layers of skin in thigh, and recorded the clinically examination before and after induce contaminated wounds in two group, clinically examination appear of body temperature, heart rate and respiratory rate and nature of feces, urin as well as activity of animals are normal and examined (control) group which reveals many changes in clinical signs and recorded the differentiated between of them. Physical examination including body temperature, respiration and heart rates of all animals.

#### Blood sampling:

Blood samples were collected from jugular vein into EDTA tubes for routine hematological parameters,

while plain tubes used for serum collection. Plain tubes were centrifuged for 10 minutes at 3000 rpm and Serum was then transferred into Eppendorf tubes and storage under freezing until be exam (12) .

#### **Hematological and biochemical Parameters:**

The measurement of alanine transfers enzyme, urea and creatinine were carried out by commercial kits (sigma-Aldrich company, Parsazmoon, Co, Iran) according to instruction manufactured ,all routine blood parameter were obtained by automatic hematology analyzer (Sysmex-T0a japan).

#### **Statistical analysis:**

The obtained data was statically analyzed for means and significances

between groups using ANOVA according to computerized SPSS program (version 7) .

#### **Results:**

##### **Clinical study:**

The physical examination of treated and control groups appeared there was non-significantly differences between donkeys in body temperature , respiratory rate and heart rate in first day, but the means values of body temperature, respiratory and heart rate showed significant ( $p < 0.05$ ) increase in control group ( $38.4 \pm 0.5$ ), ( $24 \pm 0.4$ ) and heart rate ( $56 \pm 0.3$ ) than in treated study group as ( $37.2 \pm 0.18$ ), ( $16 \pm 0.54$ ) and heart rate ( $44 \pm 0.50$ ) respectively after using the drug

**Table (1) :Physical examination (body temperature ,respiratory and heart rates) in both control and treated groups means $\pm$ SE,**

Parameters	Control group n=3 M $\pm$ SE	treated group n=5 M $\pm$ SE
Temperature /C°	38.4 $\pm$ 0.5) a	37.2 $\pm$ 0.18 b
Heart rate / minute	56.5 $\pm$ 0.3 a	44 $\pm$ 0.5 b
Respiratory rate/ minute	24 $\pm$ 0.4 a	16 $\pm$ 0.54 b

The differences in small letters horizontally refer to presence of significant value at ( $p < 0.05$ ).

#### **Hemogram picture**

According to table (2) ,there was no significant ( $p > 0.05$ ) difference in RBCs counts , Hb level and PCV as ( $6.9 \pm 0.013$ ), ( $12.1 \pm 0.11$ g/d), ( $37.95 \pm 0.34$ ) respectively in treated animal group when compared with control donkey group, total leukocyte count revealed significantly ( $p < 0.05$ ) differences between treated donkey ( $11.4 \pm 0.18$ ) and control group ( $13.9 \pm 0.20$ ) and the differential WBCs ratio appeared neutrophilia (44%), lymphocytopenia (53%) in control group when compared with treated group ,while eosinophils, monocytes and basophils didn't appeared significant ( $p > 0.05$ ) differences between two both donkeys groups.

**Table (2). The results of hematological picture of control and treated donkey group; means  $\pm$  SE.**

Hematological parameters	Groups	
	Control donkey (n=3)	Treated donkey (n=5)
RBC( $\times 10^6/\mu\text{L}$ )	6.7 $\pm$ 0.15a	6.9 $\pm$ 0.13a
Hb (g/dL)	12.4 $\pm$ 0.12a	12.1 $\pm$ 0.11a
PCV(%)	38.2 $\pm$ 0.77a	37.95 $\pm$ 0.34a
WBC( $10^9/L$ )	13.9 $\pm$ 0. 20 b	11.4 $\pm$ 0.188a
Neutrophils%	43a	33b
Lymphocytes%	53a	59b
Eosinophils%	2.1a	2a
Monocytes%	7.3 a	5.3a
Basophils%	0.6a	0.71a

The differences in small letters horizontally refer to the presence of significant value at ( $P < 0.05$ ).

### Biochemical Laboratory Test:

The biochemical tests of control and treated group were showed no significant( $p > 0.05$ ) differences between them, the means values of alanine transfers enzyme, creatinin and urea as (15  $\pm$  0.43), (1.3 $\pm$ 0.031 mg/dl) and (25.3 $\pm$ 0.3mg/dl) respectively in treated group and (14.6 $\pm$ 0.13), (1.24 $\pm$ 0.02) and (24 $\pm$ 0.5) in control group as table (3).

**Table (3). The results of biochemical tests of control and treated donkey group; means  $\pm$  SE**

Parameter	Controlgroup Mean $\pm$ SE	Treated group Mean $\pm$ SE
ALT U/L	14.6 $\pm$ 0.13a	15 $\pm$ 0.43a
Creatinine Mg/dL	1.24 $\pm$ 0.02a	1.3 $\pm$ 0.031a
Urea Mg/dL	24 $\pm$ 0.5a	25.3 $\pm$ 0.3a

The differences in small letters horizontally refer to the presence of significant value at ( $P < 0.05$ ).

The values of Serum alanine transfers enzyme, creatinine and urea for donkeys were illustrated in the (Table, 3) not appear highly significant differences between of them. None of the treated donkeys in this experimental exhibited signs of tissue reaction noted at the site of injection .

### Discussion

Under the conditions of this study (Kacolis<sup>®</sup>) appears to be safe and free from producing untoward effect when administered parenterally at 1ml/7kg.body weight in donkeys. The total absence of adverse clinical signs, and the lack of change beyond the normal clinical values in the biochemical values post dosing indicate that a drug related toxicosis did not occur. The clinical examination which reveal in treated were similar to those in donkeys (10,13) during behavior describe the donkey in case rest through their study. In the present study, the physical examination signs appear in treated group donkey as temperature rate, heart rate and respiratory rate concern with those achieved by (8,9).

The range of RBCs, Hb and PCV of treated donkey obtained in the present study table (8) agreed with the range of healthy donkey (11,14,15,16,17), especially when compared with control group which reveal increase result total white blood cell count due to high ratio of neutrophil cells because occurrence the infection in control donkeys.

The concentration of creatinine and urea were also recorded by (13) whose found that the concentration of creatinine in donkeys were (0.98±0.02 mg/dl)(25.6 ±0.2mg/dl) respectively. These results agree with current result. Urea and creatinine generally can help in assessing renal disease in animals and humans. (18,19,20,21,22). The result of serum alanine transferase enzyme was agreement with those reported for donkeys in (16). And these values refers to the function of liver unaffected by mixture.

So none of the treated donkeys in this experimental exhibited signs of tissue reaction noted at the site of injection during administration of Kacolis via the intramuscular route.

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