



## Therapeutic trial on clinical cases of impactive and spasmodic colic in donkeys in Gondar, northwest Ethiopia

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### Abstract

The therapeutic trial was conducted from December 2018 to May 2019 to compare the therapeutic efficacy of different drug regimens in the treatment of impactive and spasmodic colic in donkeys in Gondar, Northwest Ethiopia. Twenty-five purposively selected donkeys were used in this study. Ten of them were showing suspected clinical signs of impactive colic and the remaining ten were with spasmodic colic. The rest five donkeys were kept as control group. For this trial, each disease category was again grouped into two subgroups. The first sub-group in group A with suspected spasmodic colic was treated with ivermectin and, the second sub-group was treated with fenbendazole. Similarly, the first subgroup in group B with suspected impactive colic was treated with meloxicam and the remaining subgroup was treated with hyoscine butyl bromide. Most vital parameters were recorded before and after treatment of colicky donkeys. Feces and blood samples were collected and examined pre and post treatment from each donkey. Donkeys treated with ivermectin subcutaneously have 97.3% fecal egg count reduction percentage, whereas donkeys treated with fenbendazole orally have fecal egg count reduction percentage of 79.85%. Donkeys treated with meloxicam, most of the clinical signs disappear within 24 hours of time after treatment. Subcutaneous administration of ivermectin was effective for the treatment of spasmodic colic due to *Strongyle* infestation in donkeys. Therefore, field veterinarians should practice subcutaneous administration of ivermectin and intramuscular administration of meloxicam for effective treatment of spasmodic and impactive colic in donkeys, respectively.

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### Introduction

Ethiopia has the largest population of equines in Africa and the second in the world next to China, by possessing 2.16 million horses, 8.44 million donkeys and 0.41 million mules (1). The country possesses approximately half of Africa's equine population with 37% donkeys, 58% horses and 46% mules; from these donkey's population of the Amhara region contributes 36.1% of the donkey's population of the country (2). In Ethiopia one of the major health problems of donkey is colic, which commonly affects the health and welfare of

donkeys. Research has demonstrated that the causes are complex and there are conflicting views about the impact of individual risk factors. Some risk factors were well documented, like change in feed, poor deworming practice, heavy work and *Strongylus* infestations (3,4). Distension, enteritis, simple and complete obstruction are major causes of colic in equine, but lesion involving gastrointestinal tract (GIT) is the most important cause of colic (5). Clinical signs of impactive and spasmodic colic were varied with severity of pain. The most common clinical signs include pawing, lying down, rolling, sweating, stretching out, straining to

defecate, abdominal distension, loss of appetite, dullness, and decreased or increased the number of bowel movements (6). The heart and respiratory rate may also become elevated; the mucous membranes may become white, purple blue or red (7). Diagnosis of impactive and spasmodic colic is based on history, physical and laboratory examination. Impactive colic was diagnosed by its clinical signs like over distention of abdomen, rolling, lying down, dullness, anorexia, decreased intestinal motility and distended colon, caecum and pelvic flexure with dry feces, while spasmodic colic is diagnosed by fecal examination and physical observation of clinical signs like frequent rolling, an audible gut sound heard from the distance and increase intestinal motility (4).

The key principles in the treatment of equines colic are pain management, decompression of the gastrointestinal tract, correcting biochemical and fluid imbalances, stimulation and maintenance of gastrointestinal motility and reduction of GIT inflammation (8). In Ethiopia, the prevalence of colic in donkey is not known, but one study was conducted in and around Bishoftu town reported a prevalence of 9.1%. Among the colic types, impactive colic was high in donkeys, which accounts for 78.6% in Bishoftu town (4).

Even though, there is a study conducted in Bishoftu of Ethiopia about colic but, the study has limitations because it is not including hematological, electrolyte and/or biochemical alteration associated with the cases of colic. Besides, field veterinarians and clinicians also use ivermectin for the treatment of spasmodic colic in equine due to parasitic infections orally out of the manufacturer's instruction.

Therefore, this study was carried out with the objectives of comparing the therapeutic efficacy of different drug regimens in the treatment of impactive and spasmodic colic in donkeys and evaluating the physiological, hematological, electrolyte and biochemical changes in cases of colic.

## **Materials and methods**

### **Description of the study area**

The study was conducted at the University of Gondar veterinary clinic in Gondar town is located 740 km from Addis Ababa, the capital city of Ethiopia. It is located at the latitude of 12°36' North and longitude of 27°2' East with an altitude of 1800-2500 meters above sea level. The annual temperature of the area is 12.3-30°C with an average temperature of 19.7°C. The livestock population of Central Gondar zone was estimated to be 1,556,549 cattle, 438,879 sheep, 599,289 goats, 8,789 horses, 3,351 mules, 227,871 donkeys, 2,032,905 poultry and 102,564 beehives (9).

### **Study animals**

The study animals were twenty-five colic and non-colic donkeys that are presented to clinics.

### **Study design**

A therapeutic clinical trial was conducted, to compare the efficacy of different drug regimens on donkeys suffering from spasmodic and impactive colic.

### **Sampling method and sample size**

Donkeys showing suspected clinical signs of colic based on physical and systemic diagnostic techniques were selected purposively. A total of 25 donkeys were included in this study, from these 20 (11 females and males) colicky and 5 healthy donkeys age of 4-20 years and have a body weight of 100-225 kg were used.

### **Data collection methods**

History of study donkeys like feed intake and type of feed, change in feed, treatment, types of work, defecation status, and flank distention were recorded beside that, clinical and physical examinations (gait and posture, mucus membrane color and CRT) of donkey and all donkeys with the history of dietary change and/or showing suspected clinical signs of colic were further assessed for deep physical and laboratory examinations. Complete auscultation of thorax and abdomen were performed to detect any abnormality in the heart, lung and intestine by using stethoscope. Also, rectal palpation and naso-gastric intubation were performed to detect the cause of colic. The hydration statuses of donkeys were assessed through skin tenting test and CRT before and after treatment.

### **Laboratory examination**

Fecal, hematological, electrolyte and biochemical laboratory examinations were performed before and after treatment. For fecal examination, the fecal sample was taken from the rectum using arm length glove to detect gastrointestinal nematodes egg by direct fecal smear and floatation techniques. Fecal samples were collected from 10 donkeys with spasmodic colic at 0 (before treatment), 3, 7, 14 and 21 days' post-treatment. Then, anthelmintic efficacy was estimated using a fecal egg count reduction test (FECR) for helminths burden. McMaster techniques were used to count the egg per gram (EPG) of feces to estimate the parasitic loads, which was done in the University of Gondar parasitology laboratory. The arithmetic mean of the egg count and helminthes burden was calculated to determine the mean percentage reduction within each sub-group, according to the following formula  $FECR\% = \frac{(\text{pre treatment} - \text{post treatment})}{\text{pre treatment}} \times 100$  (10). The blood samples were collected before and after 48 hours of treatment for hematological, electrolyte and biochemical examinations. A total of 14 ml of blood were collected from each colicky and control donkeys aseptically from jugular vein puncture by using plain and EDTA coated vacutainer tube. Then haematological values were immediately analysed by using automatic haematology analyzer (Automatic Full Digital cell counter, Beckman, USA). Total Leukocyte Count (TLC),

Total Erythrocytes Count (TEC), Hemoglobin estimation (Hgb%), Mean Cell Volume (MCV), Mean Cell Hemoglobin (MCH), Mean Cell Hemoglobin Concentration (MCHC) and packed cell volume (PCV) were analyzed in the University of Gondar Specialized Teaching Hospital Hematology laboratory.

For biochemical and electrolyte analysis, the blood collected in plain vacutainer was allowed to clot at room temperature so separate serum. The serum sample was

subjected to a standard biochemical analysis by using Spectrophotometer (Cecil 2031, Cambridge, England) to determine serum concentration of Aspartate aminotransferase (AST), Alkaline phosphatase (ALP), triglycerides (TG), glucose and total protein content. Serum concentrations of sodium (Na<sup>+</sup>), potassium (K<sup>+</sup>), calcium (Ca<sup>+</sup>) and Chloride (Cl<sup>-</sup>) were measured by Auto Electrolyte Analyser (Roch 986 UVL, Japan) at the University of Gondar Specialized Teaching Hospital (Table 1).

Table 1: Animal grouping and drug regimens

Grouping	Sub group	No.	Type of drugs	Dosage, route frequency
Spasmodic	I	5	Ivermectin	0.2 mg/kg, SC, stat
			Hyoscine butyl bromide	0.3mg/kg, IM, Stat
	II	5	Fenbendazole	10 mg/kg, PO, stat
			Hyoscine butyl bromide	0.3mg/kg, IM, Stat
Impactive	I	5	Meloxicam	0.6 mg/kg,IM, stat
			liquid paraffin	10ml/kg, nasogastric tube
	II	5	Ringers lactate	10 ml/kg, IV, stat
			Hyoscine butyl bromide	0.3 mg/kg, IM, stat
Non-colic	-	5	liquid paraffin	10ml/kg, nasogastric tube
			Ringers lactate	10 ml/kg, IV, stat
			Not medicated	---

No.= number of donkeys, IV= intravenous, IM= intramuscular, PO= per oral. The effectiveness of the drugs was compared based on of time of clinical signs disappearance after treatment, change in physiological parameters, FECR%, electrolyte, biochemical and hematological values change after treatment.

### Statistical analyses

All data collected during the study period has been checked, coded and entered into Microsoft Excel and analyzed by using STATA software Version 14 and presented in forms of descriptive statistics. The before and after treatment data and between treatment groups were analyzed using t-test and P<0.05 was considered as statistically significant.

### Results

All physiological parameters were increased in all colic cases as compared to mean of control group donkeys but, the mean rectal temperature of donkeys with spasmodic and impactive colic were lower than the mean of the control group (Table 2).

In the present study, the mean of hematological values was recorded in both treatment and control groups before treatment (Table 3). There was no difference in mean of TEC and MCH between colic cases and control group. The mean of TLC and PCV were increased in colic cases as compared to mean of control group, whereas mean of MCV, MCHC and Hgb decreased in colic cases as compared to mean of control group before treatment.

There were no mean differences in serum concentration of AST, ALP, TG, Na<sup>+</sup> and Cl<sup>-</sup> between colicky donkeys and control group (Table 4). The mean of total protein was

increased, but there were decreased in mean serum concentration of glucose, calcium and potassium in colicky donkeys as compared to the control group before treatment.

The mean of fecal egg count reduction percentage and the range of Egg Per Gram (EPG) of feces for spasmodic colic donkey from day zero to day 21.

The mean fecal egg count reduction percentage of sub-group I and sub-group II were 97.30% and 79.85% with 95% lower confidence limit of 90.04% and 55.23% were found in current study, respectively (Table 5).

Meloxicam has better efficacy than hyoscine butyl bromide in the treatment of impactive colic donkeys since Most of the clinical signs of colic were treated by meloxicam (subgroup I) were disappear within 24 hours of time, whereas colicky donkeys treated with hyoscine butyl bromide (subgroup II) most of the clinical sings were disappear within 48 hours of time (Table 6).

There was statistically significant mean difference in heart rate, capillary refill time and rectal temperature in impactive colic between sub-groups after treatment, but there was no statistically significant difference in mean pulse and respiratory rate were found in the current finding (Table 7).

The mean difference of total leukocytes counts and PCV values between subgroups were statistically significant, but total erythrocytes, MCV, MCH, MCHC, and Hb values were not statistically between subgroups. The mean differences of

serum concentration of glucose, Ca<sup>+</sup> and K<sup>+</sup> values of Sub-group I and Sub-group II were statistically significant, but

there were no statistically significant mean differences of other biochemical and electrolyte values (Table 8).

Table 2: The mean of physiological parameters of treatment as compared to control group

Parameters	Colicky donkeys			Control donkeys		
	M±SD	Minimum	Maximum	M±SD	Minimum	Maximum
Heart rate	62±13.46	44	80	52±6.32	44	60
Pulse rate	58.1±13.52	40	77	48±6.32	40	56
Respiratory rate	24.9±7.41	12	40	18.4±4.56	12	24
CRT	2.08±0.61	1.5	3	1.7±0.27	1.5	2
Temperature	36.34±0.87	35	38	37.26±0.33	36.9	37.7

\*M±SD Values are mean ± standard deviation.

Table 3: The mean of hematological values of treatment as compared to control group

Parameters	Colicky Donkeys			Control Donkeys		
	M±SD	Minimum	Maximum	M±SD	Minimum	Maximum
TEC (*10 <sup>6</sup> /µL)	5.85±0.9	4.57	7.8	5.77±0.77	4.96	6.77
TLC (*10 <sup>3</sup> /µL)	15.29±3.31	10.3	22.4	11.52±2.51	9.3	18.2
MCV (fL)	57.31±5.74	52.5	75.4	59.24±2.98	55.5	62.8
MCH (pg)	20.86±1.51	19	24.1	20.84±1.29	19.5	22.7
MCHC (g/dL)	34.41±4.08	29	43.2	34.74±1.08	33.3	36.2
PCV (%)	35.23±5.48	28.9	48.3	34.12±3.34	30.9	37.7
Hgb (g/dL)	10.92±1.92	8.8	14	11.98±1.01	10.9	13.2

\* M±SD Values are mean ± standard deviation.

Table 4: The mean of biochemical and electrolyte parameters of treatment as compared to control group

Parameters	Colicky Donkeys			Control Donkeys		
	M±SD	Minimum	Maximum	M±SD	Minimum	Maximum
AST (IU/L)	265.4±17.24	235	290	265.3±16.86	236	298
ALP (IU/L)	329±46.06	248	403	328.8±60.11	249	403
TG (mg/dl)	57.98±4.88	51.98	67.4	58.26±4.20	52.94	67
Glu (mmol/L)	4.06±0.95	2.8	5.2	4.27±0.75	3.25	5.25
TP (mmol/L)	6.19±1.08	4.7	8	5.97±0.87	4.85	7.11
Na <sup>+</sup> (mmol/L)	132.14±3.24	127.5	138.5	132.28±3.92	128.6	137.8
Ca <sup>+</sup> (mmol/L)	2.18±0.79	1	3.7	2.86±0.27	2.5	3.2
K <sup>+</sup> (mmol/L)	2.92±1.48	1.2	5.1	4.95±0.25	4.65	5.3
Cl <sup>-</sup> (mmol/L)	99.55±2.11	95.4	103	99.44±1.75	97.5	101.5

\* M±SD Values are mean ± standard deviation.

Table 5: Arithmetic mean fecal egg counts (mean±SD) and reduction percentage of spasmodic colic groups

Days	Sub-group I			Sub-group II		
	Arithmetic mean	Range	Mean FECR %	Arithmetic mean	Range	Mean FECR %
0	1620±397.99	800-3000	-	1840±206.39	1400-2600	-
3	780±101.98	0-600	90.42%	920±48.98	800-1100	60.5%
7	20±20	0-100	98.76%	600±44.72	500-700	77.39%
14	0	0	100%	320±37.42	200-400	83.70%
21	0	0	100%	40±24.49	0-100	97.82%
M FECR%	-	-	97.30%	-	-	79.85%
95%LCL	-	-	90.04282	-	-	55.2319
95% UCL	-	-	104.6472	-	-	104.4731

MFECR%=Mean fecal egg count reduction percentage, 95%LCL=95% lower confidence limit, 95%UCL=upper confidence limit.

Table 6: Time of clinical signs disappearance after treatment of impactive colicky donkeys

Physical examination	Clinical signs	Time of clinical signs disappearance after treatment					
		Sub-group I (hours)			Sub-group II (hours)		
		1	24	48	1	24	48
Abdomen	Pain	40%	60%		20%	60%	20%
	Distension	20%	80%		0	80%	20%
Abdominal auscultation	Normal	20%	100%		60%	80%	20%
	Decreased	60%	20%		20%	0	
	Absent	0	0		0	0	
Mucous membrane	Congested	20%	20%		0	20%	
	Pale	0	20%		0	0	20%
	Pink	40%	100%		60%	80%	100%
Appetite	Normal	0	80%	20%	0	40%	60%
	In-appetence	100%	20%	0	100%	60%	
Rectal sphincter	Tight	60%	100%		40%	80%	20%
	Dilated	0	40%		0	40%	0
Behavior	Dullness	100%	80%	20%	100%	60%	40%

Table 7: Mean difference of physiological parameters between sub-groups after treatment (12 hrs)

Physiological parameters	Mean after treatment		Mean difference	95% Interval difference		T value	Sig.
	Sub-group I	Sub-group II		Lower	Upper		
Heart rate	50.40	58.40	-8	-15.26300	-7.73700	-2.54	0.035
Pulse rate	48.40	54.40	-6.4	-14.95400	2.15400	-1.725	0.123
Respiratory rate	23.20	22.40	0.8	-8.42402	10.0242	0.20	0.846
CRT	1.52	1.64	-0.12	-.22313	-.01687	-2.683	0.023
Temperature	37.4	36.6	0.8	.00786	1.59214	2.329	0.048

Table 8: Mean difference of hematological, electrolyte and biochemical values of impactive groups after 48 hours' treatment

Hematological/ Biochemical	Mean after treatment		Mean difference	95% Interval difference		T value	Sig.
	Subgroup I	Subgroup II		Lower	Upper		
TEC	6.20	5.57	0.634	-0.58336	1.85136	1.201	0.086
TLC	11.42	13.34	-1.92	-3.99156	0.15156	-2.137	0.046
MCV	57.10	58.66	-1.56	-7.33358	4.21358	-0.623	0.551
MCH	21.08	22.16	-1.08	-3.01759	0.85759	-1.285	0.235
MCHC	37.14	37.98	-0.84	-6.47439	4.79439	-0.344	0.740
PCV	33.98	36.32	-2.34	-9.32297	4.64297	-0.773	0.012
Hgb	11.82	10.46	2.36	-1.18498	3.90498	1.232	0.695
AST	258.8	257.8	1.00	-20.51886	22.51886	0.107	0.917
ALP	305.6	305.8	-0.20	-81.30122	80.90122	-1.088	0.308
TG	56.94	58.72	-1.78	-12.60177	9.04177	-0.379	0.714
GLU	5	3.86	1.14	0.72364	1.55636	6.314	0.000
TP	6	6.63	-0.63	-1.42330	0.15530	-1.852	0.101
Na <sup>+</sup>	134.44	134.74	-0.30	-4.83304	4.23304	-0.153	0.882
Ca <sup>+</sup>	3	2.02	0.98	0.39480	1.56520	3.862	0.005
K <sup>+</sup>	3.94	2.16	1.78	0.65927	2.90073	3.663	0.006
Cl <sup>-</sup>	98.82	100.38	-1.56	-4.09639	0.97639	-1.418	0.194

**Discussion**

In the current study, the mean physiological parameter values of heart rate, pulse rate, respiratory rate and capillary

refill time were elevated in donkeys with spasmodic and impactive colic as compared to the control donkeys even with working donkeys of Ethiopia as previously reported by Lemma and Moges (11). This finding is in line with the

previous study in Ethiopia (12,4) and abroad (13). These physiological parameters elevations might be due to pain, violent struggle and over distension of abdomen, which had a direct effect on the cardiopulmonary system. The mean rectal temperature was decreased in colicky donkeys as compared to the control group, which is in agreement with the previous report in colicky donkeys (14). This might be due to loss of fluid and electrolyte from vascular space to the gastrointestinal lumen to hydrate the impacted ingesta and which in turn the resulting shock (15). The observed values of mean PCV and TLC were elevated in colicky donkeys as compared to control donkeys. The elevation in PCV value in the present finding is in agreement with report of Worku *et al.* (12) and Tadesse *et al.* (4); this due to dehydration and increasing concentration of circulating blood cells to compensate the fluid loss in donkeys with impactive colic (4). The elevation of TLC in the current finding is in line with the findings of Baher *et al.* (14), and might be due to stress in colicky donkeys, which results in liberation of corticosteroid to increased levels in the blood that prevent migration of white blood cells (majorly neutrophils) out of the blood vessels to the tissues (16). The mean serum concentrations of AST, ALP, TG, Na<sup>+</sup> and Cl<sup>-</sup> in colicky donkeys were close to control groups and this finding is similar to other studies done earlier on colicky donkeys and horses (14,17). Other studies have reported hyperkalaemia, hypochloroemia and hyponatremia in colicky horses (18,19), which disagree with the present findings. The mean serum calcium concentration was decreased in colicky donkeys as compared to the control donkeys. This result is in line with other studies in colicky donkeys and horses (14,17,19).

The reason for decreased serum concentration of calcium in colic cases might be due to functional disturbances of the small intestine, which reduces the absorption of calcium (20). The mean serum concentration of potassium was decreased in the colicky donkeys as compared to control donkeys in the current findings. This result is in agreement with the findings of other previous studies in the colicky horse (21-23).

This might be a colicky donkey's altered feed intake and absorption and loss potassium through sweating and saliva. The elevation of the mean total plasma protein in colicky donkeys as compared to the control group in the present finding is in line with the previous report by Baher *et al.* (14). This could be due to dehydration developed during impactive colic as a result of fluid loss.

In the current study, subcutaneous administrations of ivermectin to donkeys were shown 97.30% mean fecal egg count reduction percentage with 95% lower confidence limit of 90.04%.

This indicates that, parasites were susceptible for ivermectin and similar studies were also reported by (24-26). Donkeys treated with fenbendazole were shown 79.85% mean fecal egg count reduction percentage with 95% lower confidence limit of 55.23%. This finding is in agreement

with the previous report of Seyoum *et al.* (23) in horses. The *Strongylus* nematodes develop resistance to fenbendazole in donkeys observed in the current study. This might be due to improper deworming practice of fenbendazole by owners and the first-pass effect drug as described by Gokbulut *et al.* (24).

On the other hand, administration of meloxicam showed better efficacy than hyoscine butyl bromide in the treatment of impactive colic. Donkeys with impactive colic were treated with meloxicam become active and relieved from dullness, abdominal pain (rolling) and distension within 24 hours of time after treatment. This finding is in agreement with reports of Regan *et al.* (25) in UK.

The reduction in clinical parameters might be due to selective inhibition of cyclooxygenase 2 (COX2) by meloxicam, which was responsible for pathophysiological conditions beside that meloxicam has better gastrointestinal tolerability than other nonselective NSAIDs (26). Hyoscine butyl bromide was less effective in the treatment of impactive colic in donkeys as compared to meloxicam in the current study, which is in accordance with previous study on colic in horses (27).

In the present findings, there were statistically significant mean differences of the total leukocytes count, PCV, serum concentrations of glucose, calcium and potassium values between meloxicam treated and hyoscine butyl bromide treated groups. There is no other report to compare with the present findings. Hyoscine butyl bromide has a temporary inhibitory effect on intestinal motility, which might be undesirable in the treatment of impaction cases (15).

The mean of total leukocytes count was close to the control group in meloxicam treated group. These reductions of TLC in meloxicam treated group were due to selective inhibition of Cox 2 and subsequent subsiding of inflammations (28).

Moreover, as inflammation subsiding, blood circulation, intestinal motility and absorption returned normal subsequently. The mean serum concentrations of glucose become normal since the pain was relieved and the appetite of donkeys improved after treatment with meloxicam. The mean serum concentration of calcium and potassium were increased significantly after treatment of donkeys with meloxicam. This might be due to disappearances of clinical signs and the improvement of appetite, intestinal motility and absorption in donkeys (29) which results no extra loss of calcium and potassium after treatment of donkeys with meloxicam.

## **Conclusion**

In general, intramuscular administration of meloxicam and subcutaneous administration of ivermectin was effective for the treatment of impactive and spasmodic colic in donkeys, respectively. Thus, meloxicam should be used by field veterinarians and clinicians since it is the most effective

treatment of impactive colic in donkeys and subcutaneous administration of ivermectin should be practiced in the treatment of gastrointestinal nematodes in donkeys.

### Conflict of interest

The authors of this article declared that there is no potential conflict of interest in the publication of this article

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تم معاملتها كمجموعة سيطرة. لهذه المحاولة العلاجية، كل مجموعة تم تقسيمها أيضا إلى مجموعتين ثانويتين. المجموعة الثانوية الأولى هي المجموعة أ التي تضم الحالات المشكوك بها بالمغص التشنجي تم علاجها بعقار الايفرمكتين، أما المجموعة الثانوية الثانية تم علاجها بعقار الفينبندازول. وبطريقة مماثلة للسابق، المجموعة الثانوية الأولى هي المجموعة ب والتي تضم الحالات المشكوك بها بالمغص الانحشاري تم علاجها بعقار مليونكسيكام أما بقية الحيوانات بالمجموعة الثانوية الأخرى فتم علاجها بعقار هايوسين بيوتاييل بروميد. معظم المعايير الحيوية للحيوانات المصابة تم تسجيلها قبل وبعد العلاج. عينات من الدم والبراز تم جمعها وبعد ذلك تم فحصها قبل وبعد العلاج لكل حيوان. مجموعة الحمير المعالجة بعقار الايفرمكتين تحت الجلد لديها نسبة ٩٧,٣% انخفاض بعدد البيوض في البراز، بينما الحمير المعالجة بعقار الفينبندازول عن طريق الفم لديها نسبة ٧٩,٨٥% انخفاض بعدد البيوض في البراز. الحمير المعالجة بعقار مليونكسيكام معظم العلامات السريرية اختفت ضمن ٢٤ ساعة من الوقت بعد بدء العلاج. إعطاء عقار الايفرمكتين تحت الجلد كان فعال لعلاج حالات المغص التشنجي الناتجة عن إصابة الحمير بطفيليات السترولنجلس. لذلك ينصح الأطباء البيطريين بممارسة استخدام عقار الايفرمكتين عن طريق الحقن تحت الجلد وإعطاء عقار مليونكسيكام عن طريق الحقن العضلي وذلك كعلاج فعال لحالات المغص التشنجي والانحشاري في الحمير وعلى التوالي.

## المحاولات العلاجية لحالات المغص الانحشاري والتشنجي السريرية في الحمير في منطقة جوندار، شمال غرب أثيوبيا

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### الخلاصة

تم إجراء المحاولة العلاجية للفترة الممتدة من كانون الأول ٢٠١٨ إلى شهر إيار ٢٠١٩، لمقارنة الكفاءة العلاجية لمختلف الأساليب العلاجية في معالجة حالات المغص التشنجي والانحشاري في الحمير في منطقة جوندار، شمال غرب أثيوبيا. تم استخدام خمس وعشرون حمارا في هذه الدراسة. عشرة من الحمير المشمولة بالدراسة كانت تظهر علامات سريرية مشكوك بها للمغص الانحشاري أما الحيوانات العشرة الأخرى كانت تظهر علامات المغص التشنجي، أما بقية الحمير الخمسة