THE EFFICACY OF FASINEX (TRICLABENDAZOLE) AND RAFOXANIDE AGAINST NATURAL INFECTION OF BUFFALOE BY *FASCIOLA* IN SHARKIA GOVERNORATE

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ABSTRACT

Twenty one adult buffaloes aged 4-9 years were used in this investigation. Buffaloes were divided into three group 7 each. Animals of the first group healthy were apparently free from internal parasites, while those of second and third group were naturally infested with *Fasciola* were treated by Fasinex and Rafoxanide respectively. Faecal examination, haemotological, biochemical and some milk constituent studies were preformed before and after treatment. Obtained results showed that Rafoxainde and Fasinex reduced Fasciola egg to 100% at 8 week post treatment. Biochemical analysis revealed that fascioliasis induced increase in transaminases (AST–ALT), total bilirubin and decrease in serum total proteins, calcuim, inorganic phosphorus and magnesium, Haematological picture of diseased animals revealed a decrease in red blood corpuscles, haemoglobin and packed cell volume meanwhile there was increase in white blood corpuscles. Milk of diseased buffaloes show a decrease in calcuim, phosphorus, magnesium, copper, zinc and iron. All above parameter returned to the normal level post treatment by both drugs.

INTRODUCTION

Parasitic affections among animals are considered to be one of the most important problems, which induce death or decrease of animal production. Buffaloes constitute one of the most important sources of meat and milk production in Egypt. Buffaloes have a sort of resistance against infection compared with other domestic livestock (**Shalash, 1984**).

Fascioliasis is caused by *Fasciola hepatica* and *Fasciola gigantica*, its infestation still constitutes one of the major economic and health problem affecting buffaloes in Egypt. The adverse effect of liver fluke includes deaths, decline in meat and milk production, in addition to lowering in infertility of

the cattle (**Eckert *et al.*, 1984**). Essential lesions are progressive biliary cirrhosis which ultimately produces a hard fibrotic liver where the bile ducts are prominent, thickened fibrous (**Soulsby, 1968**). Fascioliasis acts as predisposing factor for other diseases (**Kimberling, 1988**).

The present study focused on evaluation of the efficacy of Rafoxanide and Triclabendazole in buffaloes naturally infested with fascioliasis, studying the biochemical parameters in serum of normal, infested and treated buffaloes as well as effect of *Fasciola* and drug treated it on milk constituents and blood picture.

MATERIAL AND METHODS

Drugs:

1) **Rafoxanide:** 7.5% solution, manufactured by the Egyptian Co. for Chemicals and Pharmaceutical (ADWIA) S.A.E.
2) **Triclabendazole:** (Fasinex)^{R} 10% CIBA – GEIGY Limited. Basle. Switzerland.

Animals:

This work was carried on total number of 21 buffaloe (14 naturally infested with *Fasciola* by laboratory examination and other 7 free from internal parasite). These animals belonged to Sharkia Governorate and their age ranged from 4-9 years old. These animals were divided into three groups 7 each. First group healthy animal free from internal parasite (control) second group was injected S/C with Rafoxanide in a dose of 1 ml/25kg b.w. (recommended dose according manufactured company). Third group treated by Fasinex tablet orally at a dose rate 12 mg/kg b.w.

1- Studies on the effect of treatment on *Fasciola* egg:

Fecal samples collected before application of drugs and in the 1st, 2nd, 3rd, 5th, 7th and 9th week post-treatment, examined using the sedimentation technique after **Kruse and Pritchard, (1982)**.

2- Studies on effect of *Fasciola* and treatment on blood picture and some biochemical analysis:

Two blood samples were collected from control buffaloes as well as from infested one before and after treatment by 2,4,6 and 8 weeks post treatment.

a) The first sample was taken in centrifuge tube to obtain clear serum for determination of transaminases (AST – ALT) according to the method described by **Reitman and Frankel, (1957)** total protein **Doumos, (1974)**, total bilirubin **Jendrassik, (1938)**. Calcium **Gindler, (1972)**, inorganic phosphorous **Goldenberg, (1966)** and magnesium **Gindler and Heath, (1971)**.

b) The second sample was taken in heparinized tube for R.B.Cs., Hb, pack cell volume and W.B. Cs. Count according to **Jain, (1986).**

3- Studies on effect of *Fasciola* and treatment on some milk constituents:

Fresh milk samples were taken from infested buffaloe before and after treatment by 15, 30 and 45 days for determination milk calcium according to the method described by **Gindler, (1972)**, inorganic phosphorus **Goldenberge, (1966)** magnesium **Gindler and Heath, (1971)**, Zinc and copper **Versieck, *et al.*, (1974)**, and iron **Drsuxc, (1977)**.

4- Statistical analysis:

The obtained data was statistically analyzed according to **Snedecor and Cochran, (1982)**.

RESULTS

It was revealed from the obtained results that Fasinex has high effect (13% 23.81%, 72.02%, 91.67%, 98.80%, and 100% at 1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 6^{th} and 8^{th} weeks post treatment respectively but Triclabendazole (16.55%, 38.85%, 65.47%, 85.61%, 96.12 and 100% at at 1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 6^{th}, and 8^{th} weeks post treatment Table (1).

The data in Table (2) showed increase in transaminases (AST – ALT) and bilirubin but decease in total proteins, calcium, inorganic phosphorus and magnesium.

Table (3) demonstrates a marked drop of red blood corpuscles, packed cell volume and haemoglobin concentration but white blood corpuscles increased.

The results in Table (4) showed a decrease in milk calcium, inorganic phosphrous magnesium, copper, iron and zinc in buffaloes infested by *Fasciola.*

DISCUSSION

A trials for determination of efficacy of Rafoxainde and Triclabendazole at a dose of 1ml/ 25kg b.w. and 12mg / kg b.w. respectively in naturally infested buffaloes were carried out in this study and the results revealed that it was 98.80% and 96.12% respectively at 6 weeks and complete disappearance of the *Fasciola* eggs were observed at 8 weeks for both drugs. The obtained results agreed with those previously obtained by **Boray *et al.*, (1983)** and **Nasser and Abd-Rabo, (1994)**. They found that triclabendazole was highly effective against cattle fascioliasis and *Fasciola* egg disappearance at 9 week post treatment. **Sohair, (1999)** found that Rafoxanide administration S/C at a dose of 1 ml / 25kg b.wt. succeeded in the reducing

flow of *Fasciola* egg count by 86.10% on 35 days in the faeces of the treated cattle.

Data presented in Table (2) showed a significant ($P < 0.001$) increase in transaminases (AST and ALT), total bilirubin and decrease in total protein, calcium, inorganic phosphorus and magnesium in buffaloes infested by *Fasciola*. The obtained results coincided with **El-blebasi, (1980)**.

Significant increase in activity of transaminase (AST – ALT) could be attributed to hepatocellular damage caused by the migration of liver fluke **(Coles, 1974 and karram *et al.*, 1985)**.

Elevation of total bilirubin level may be attributed to interference with excretion of bilirubin and / or increased production of bilirubin as a result of hemolytic toxin produced by liver flukes **Litchman, (1953) and Sinclair, (1967)**. Similar finding was reported by **Afaf *et al.*, (1991)** in ovine fascioliasis.

Decrease of total protein in our results agree with those obtained by **El-Sherif and Fahmy, (1981)** and **karram *et al.*, (1988)**. The authors suggested that the decrease in total proteins in infected animal attributed to the damage in the liver of infested animal.

Statistical analysis of the obtained result showed a highly significant decrease ($P < 0.01$) in serum calcium inorganic phosphorus and magnesium in infested buffaloes as compared to healthy one. Our results were reinforced with that of **Furmaga *et al.*, (1974); El-Hetw *et al.*, (1975) and Zakaria, (2001)** who found that serum calcium, inorganic phosphorus and magnesium were significantly decreased in sera of sheep infested with *Fasciola*. Similar findings reported by **El- Blebesi, (1980)** in cattle. **Carr, (1955)** suggested that calcium and magnesium might complete for the biding sites on the plasma protein molecules and in this event hypoalbuminaemia may be responsible for the occurrence of reduced level of both calcium and magnesium.

The blood picture (Table 3) showed a reduction in red blood cell count, pack cell volume and haemoglobin in buffaloe infested with *Fasciola*. Our results were compatible with that reported by **Dissouky, (1972) and El–Blebesi, (1980)**. **Morskin *et al.*, (1964)** who noticed that the sever anemia (loss of red blood corpuscle and haemoglobin content) accompanied liver fluke infection was due to production of a haemolytic toxin by the parasite. On other hand, with blood corpuscles count increased in infested buffaloe. This result coincides with **Dissouky, (1972)**. The obtained results supported by the finding reported by **Chaudhri *et al.*, (1995)**. They reported that there was a marked peripheral eosinophilia in buffaloe infested with *Fasciola gigantica* also **Bashoudy *et al.*, (1990)** reported that there was leucocytosis in sheep infested with *Fasciola gigantica*.

Regarding to the effect of fascioliasis on minerals and trace elements in milk in lactating buffaloes revealed that fascioliasis induced decrease in milk calcium, inorganic phosphorus, magnesium, zinc, copper and iron Table (4)

similar results recorded by **Abd – El Razek *et al.*, (1992)** in buffaloes. They attributed this decrease to the effect of anorexia in addition to disturbed metabolism in the affected liver which lead to a decrease in this elements in blood which in turn reflects directly on milk constituents.

All studied parameter were returned to the normal levels after treatment due to progressive recovery lead to decreasing hepatitis.

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Table (1): *Fasciolia* egg count in naturally infested buffaloes following Rafoxanide and Fasinex injection (n = 7)

Drug	Animal number	Egg count / gram faeces before treatment	Egg count / gram faeces Post treatment											
			1 week		2 week		3 week		4 week		6 week		8 week	
Rafoxanide	1	50	40	20%	25	50%	10	80%	5	97.5%	0	100%	0	100%
	2	120	110	8.33%	75	37.5%	40	66.67%	10	91.7%	0	100%	0	100%
	3	90	80	11.11%	40	55.56%	15	83.33%	0	100%	0	100%	0	100%
	4	200	160	20%	110	45%	50	75%	20	90%	10	95%	0	100%
	5	70	60	14.29%	30	57.14%	10	85.71%	0	100%	0	100%	0	100%
	6	150	130	13.33%	80	46.67%	50	66.67%	15	90%	0	100%	0	100%
	7	160	150	6.25%	100	37.5%	60	62.5%	20	87.5%	0	100%	0	100%
Fasinex	1	170	140	17.65%	10	41.18%	70	58.82%	35	79.4%	10	94.12%	0	100%
	2	200	170	15%	130	35%	105	47.5%	70	65%	30	85%	0	100%
	3	80	70	12.5%	40	50%	20	75%	0	100%	0	100%	0	100%
	4	280	260	7.14%	240	14.29%	110	60.71%	30	89.3%	0	100%	0	100%
	5	230	210	8.70%	170	26.09%	105	54.35%	25	89.1%	0	100%	0	100%
	6	210	160	23.81%	90	57.14%	40	80.95%	25	88.1%	4	98.10%	0	100%
	7	220	150	31.82%	70	68.18%	30	86.36%	15	93.2%	10	95.45%	0	100%

Table (2): Mean value of serum organic and inorganic constituents of buffaloes infected with *Fasciola* before and after treatment (n = 7).

Panrameter	Healthy buffaloes	Infected and non treated	Infected and treated							
			Fasinex				Rafoxanide			
			2 week	4 week	6 week	8 week	2 week	4 week	6 week	8 week
AST (u/l)	38.43 ± 1.72	57.57 ± 3.67***	54.5 ± 4.15**	51.59 ± 4.57*	42.91 ± 4.76	41.20 ± 4.90	53.12 ± 2.35***	51.20 ± 3.70**	42 ± 2.95	39.50 ± 3.20
ALT (u/l)	10.72 ± 0.95	17.12 ± 0.57***	15.22 ± 0.98**	14.11 ± 0.78*	12.35 ± 0.87	11.30 ± 0.88	14.17 ± 0.81*	14.01 ± 1.05*	13.11 ± 0.75	11.33 ± 0.95
T.Protein (gm/dl)	68.54 ± 2.58	50.43 ± 3.20***	53.32 ± 3.72**	59.11 ± 3.10*	62.51 ± 4.23	65.70 ± 2.95	55.12 ± 2.12**	61.33 ± 1.75*	64.83 ± 2.93	67.94 ± 3.21
T.Biluibin (gm/dl)	3.64 ± 0.54	6.01 ± 0.68*	5.16 ± 0.45*	4.99 ± 0.18	3.9 ± 0.07	3.53 ± 0.11	6.57 ± 0.56**	5.84 ± 0.62*	4.86 ± 0.51	3.57 ± 0.37
Calcium (gm/dl)	9.84 ± 0.38	6.69 ± 0.87**	7.4 ± 0.94*	8.69 ± 1.01	8.87 ± 0.87	9.53 ± 0.888	6.17 ± 0.88**	7.14 ± 0.86*	7.84 ± 0.99	8.53 ± 0.92
Phosphorus (gm/dl)	8.84 ± 0.49	6.31 ± 0.33**	6.86 ± 0.41**	7.39 ± 0.33	7.69 ± 0.40	8.37 ± 0.47	6.34 ± 0.48*	6.63 ± 0.55*	7.53 ± 0.42	8.14 ± 0.46
Magnesium (gm/dl)	3.12 ± 0.26	2.23 ± 0.13*	2.40 ± 0.16*	2.45 ± 0.12*	2.88 ± 0.09	2.94 ± 0.14	2.01 ± 0.20**	2.36 ± 0.18*	2.73 ± 0.24	3.3 ± 0.35

*** significant at P < 0.05**
**** significant at P < 0.01**
***** significant at P < 0.001**

Table (3): Haemogram of normal and infested buffaloes before and after treatment (n = 7).

Panrameter	Healthy buffaloe	Infected and non treated	Infected and treated							
			Fasinex				Rafoxanide			
			2 week	4 week	6 week	8 week	2 week	4 week	6 week	8 week
R.B. Cs. (10^6/c.mm)	7.84 ± 0.53	4.71 ± 0.68 *	4.97 ± 0.61 *	5.46 ± 0.45 *	5.93 ± 0.53 *	7.96 ± 0.59	4.86 ± 0.64 *	5.17 ± 0.52 *	5.51 ± 1.01	6.23 ± 0.79
H.b (g m %)	13.88 ± 0.58	9.03 ± 1.44 *	8.86 ± 1.77 *	9.86 ± 1.37 *	10.29 ± 1.52 *	10.71 ± 1.54	10.43 ± 0.84 *	11.29 ± 0.92 *	11.86 ± 0.91	12.14 ± 0.70
P.C.V. (%)	39.56 ± 4.05	32.53 ± 2.32 *	33.29 ± 2.23 *	34.43 ± 2.25 *	35.14 ± 2.31	37.34 ± 2.30	33.71 ± 2.17 *	35.86 ± 1.99	35.71 ± 2.25	37.86 ± 2.08
W.B. Cs. (10^3/cmm)	9.07 ± 0.86	12.14 ± 0.86 *	11.29 ± 0.57 *	10.43 ± 0.78	9.71 ± 0.61	9.29 ± 0.68	11.85 ± 0.51 *	11.14 ± 0.91	10.14 ± 1.01	9.43 ± 1.02

* significant at P < 0.05

Table (4): Mean value of milk/minerals and trace elements of buffaloes infested with *Fasciola* before and after treatment (n = 7).

Panrameter	Healthy buffaloes	Infected and non treated	Infected and treated					
			Fasinex			Rafoxanide		
			15 day	30 day	45 day	15 day	30 day	45 day
Calcium (mg %)	147.13 ± 3.97	123.88 ± 3.82 ***	142.81 ± 3.71 **	130.72 ± 3.91 *	140.01 ± 1.98	122.88 ± 2.81 ***	127.10 ± 3.30 **	139.21 ± 4.91
Phosphrous (mg %)	98.20 ± 4.40	75.72 ± 3.21 **	75.72 ± 4.92 **	97.83 ± 3.90 **	91.30 ± 3.30	79.62 ± 2.22 **	85.61 ± 2.11 *	89.42 ± 2.32
Magnesium (mg %)	14.65 ± 1.85	12.03 ± 0.52	11.02 ± 0.52	12.71 ± 1.20	13.65 ± 1.85	10.92 ± 0.61	10.95 ± 1.23	13.56 ± 1.78
Copper (ug %)	23 ± 1.81	15.52 ± 1.34 **	17.51 ± 1.23 **	19.20 ± 1.24	20 ± 1.91	13.52 ± 1.33 **	14.20 ± 2.30 **	19.51 ± 3.22
Zinic (ug %)	67.50 ± 6.12	47.52 ± 8.83 *	47.41 ± 9.83 *	53.31 ± 5.72 *	57.11 ± 9.81	46.31 ± 8.83 *	52.42 ± 9.10 *	55.23 ± 8.91
Iron (ug %)	104.60 ± 11.08	68.51 ± 6.24 *	80 ± 4.11 *	83.16 ± 5.70	99.60 ± 6.07	69 ± 2.12 **	79.72 ± 2.30 *	87.62 ± 10.00

* significant at P < 0.05 ** significant at P < 0.01 *** significant at P < 0.001

الملخص العربي

تقييم كفاءة عقارى الفاز ينكس (ترايكليبندازول) والرافوكسانيد على الإصابة الطبيعية بالديدان الكبدية فى الجاموس بمحافظة الشرقية

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تم استخدام ٢١جاموسة فى سن ٤-٩ سنوات لدراسة كفاءة الفاز ينكس والرافوكسانيد على الإصابة الطبيعية بالديدان الكبدية. تم تقسيم هذه الحيوانات إلى ثلاث مجموعات المجموعة الأولى خالية من الديدان الكبدية والديدان الداخلية (مجموعة محكمة) والثانية والثالثة مصابة بالديدان الكبدية وعولجت بالفاز ينكس والرافوكسانيد على التوالى.

بدراسة كفاءة الفاز ينكس والرافوكسانيد وجد ان كفاءة العقارين ١٠٠% عند ٨أسابيع من إعطاء العقارين.

وبدراسة التغيرات البيوكيميائية التى حدثت نتيجة الإصابة بالديدان الكبدية وجد زيادة فى أنزيمى الترانس أمينيزسس، البيلوربين الكلى ونقص فى البروتين الكلى، الكالسيوم الفسفور، الماغنسيوم . كذلك أدت الإصابة بالديدان الكبدية إلى نقص فى عدد كرات الدم الحمراء ، تركيز الهيموجلوبين، وحجم الخلايا المضغوطة وزيادة فى عدد خلايا الدم البيضاء.

كما أدت الديدان الكبدية أدت إلى نقص معنوى فى بعض مكونات اللبن مثل الكالسيوم، الفوسفور، الماغنسيوم، الزنك، النحاس والحديد.

المكونات السابقة عادت لمستواها الطبيعى بعد العلاج بالفاز ينكس والرافوكسانيد.