

Effect of Fasciola Infection on Some Haematological and Blood Biochemical Parameters in Ewes

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THIRTY infected and thirty non-infected ewes were used to study the effect of infection with *Fasciola sp.* on blood erythrocyte, total leucocytes and differential counts, packed cell volume (PCV) and haemoglobin (Hb). Plasma zinc and selenium were also determined.

Results indicated that non-infected ewes had significantly ($P < 0.01$) higher counts of erythrocyte but lower counts of leucocytes as compared to those fasciola infected ewes. Non-infected ewes had a lower number of all types of leucocytes than did the fasciola infected ewes.

The mean values of PCV and Hb were significantly ($P < 0.01$) higher in non-infected than infected ewes. The mean corpuscular volume (MCV) and the mean corpuscular haemoglobin (MCH) were significantly ($P < 0.01$) higher in infected ewes, but the mean corpuscular haemoglobin concentration (MCHC) was significantly ($P < 0.01$) lower in the infected than in the non-infected ewes. Zinc and selenium was lower in the infected than in the non-infected ewes. Results also indicated that body weight of the infected animals significantly ($P < 0.01$) less than that of the non-infected ewes.

KEY WORDS : (Fasciola infection, haematology, sheep)

Fascioliasis is a widespread disease among livestock all over the world (Daws, 1963 and Soulsby, 1973). This disease is considered to be endemic in Egypt

which has favorite environment table factor contribute to the existence of this disease (El-Sherif and El-Sawi, 1960 and Ezzat, 1960). In certain areas of Egypt the incidence of fascioliasis among livestock was as high as 80% and may reach 100% (Zaky, 1979 and El-Magdoub *et al.*, 1980). As a result of such infection, animal production and reproduction abilities are greatly impaired. Milk yield of dairy animals, usually decreased (Honer, 1970). Meat production and quality are also decreased as it contains less protein. The wool of the infected sheep is reduced.

Therefore, this experiment was planned to study the variations in some of the blood haematological and biochemical parameters in ewes due to the infection with *Fasciola sp.*

MATERIAL and METHODS

An extensive survey for the liver fluke *Fasciola sp.* was carried out among the herd of ewes belonging to Alexandria Governorate Project of Animal Production. According to this survey 30 infected and 30 non-infected ewes were chosen from village number two at Abis district, Alexandria Governorate, Egypt. All animals in each group were of the same age and weight.

Ewes were offered ration according to Morrison requirement standard (1957). They offered 5 kg of berseem, 450 gm of straw and 150 gm cottonseed cake per ewe per day. Water was available to animals at all times.

Individual blood samples were taken from the Jugular vein of each animal into 15 ml heparinized test tube. Sampling began at 09.00 am and was completed by 11.00 am on each sampling day. Whole blood samples were analysed for packed cell volume (PCV) using microhaematocrit tube and haemoglobin (Hb) levels using the colorimetric method of Wong as described by Oser (1965). Erythrocytes and leucocytes were counted on an Ao. Bright-line haemocytometer using a light microscope. Differential leucocytes distribution was determined using leishman's stain blood film. Mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC) were calculated using the formulas proposed by Schalm (1965).

Samples were then centrifuged at $886 \times g$ for 20 min. to obtain plasma samples. Plasma samples were used for zinc and selenium determina-

tion using methods described by Mill *et al.* (1967) and AOAC procedure (1975). Animals were weighed and samples of their faeces were obtained to count the number of eggs per gm faeces (Lapage, 1965). The differences between the infected and non-infected ewes in all of the parameters studied were detected using student t-test as described by Snedecor and Cochran (1970).

Results and Discussion

Blood haematological parameters

Results indicated that the blood of the non-infected animals had a significantly ($P < 0.01$) greater erythrocyte counts than that of the infected animals (Table 1). That the also found by Haroun and Hussein (1975), Abdel-Rahman *et al.* (1977), Rowlands *et al.* (1979) and Said and Handlos (1980). The decrease in the erythrocyte counts in infected ewes can be explained by the extensive blood losses from the infected animals and consumption of blood by flukes as has been suggested by Symons and Boray (1968).

Results also indicated that blood of infected ewes showed significantly ($P < 0.01$) higher counts of leucocytes than that of the non-infected ewes (Table 1). That high counts of leucocytes were due to the inflammation of infected ewes liver. That high total leucocyte counts observed in the blood of the infected animals was reflected in a significant ($P < 0.01$) high counts of all types of leucocytes except that of the basophilic cells (Table 1). Blood of the non-infected ewes had no basophilic cells. Eosinophilia and neutrophilia associated with infection found in this study were in agreement with the finding of Horchner (1969), Reid *et al.* (1970), Haroun and Hussein (1975) and Van Tige (1978). On the other hand, those authors found a decrease in lymphocytes and monocytes counts with infection which was not in agreement with the finding of the present experiment. They also found no basophilic cells in the blood of the infected animals which support the present results.

Present results also revealed that the infected animals had significantly ($P < 0.01$) lower mean PCV values than non-infected animals (Table 1). Knight (1978) and Rowlands (1979) found similar results. It was also found that mean haemoglobin value of the non-infected ewes was significantly ($P < 0.01$) higher than that of infected ewes (Table 1). This finding was

in accordance with the findings of El-Magdoub and Bader (1966), Morshkin *et al.* (1965) and Abdel Rahman *et al.* (1977).

Results also indicated that mean values of HCV and MCH were significantly ($P < 0.01$) higher for infected ewes than of the non-infected ewes. On the other hand, the mean MCHC for the infected ewes was significantly ($P < 0.01$) lower than the mean value for the non-infected ones (Table 1).

TABLE 1. Mean values of some of haematological and biochemical parameters of non-infected and infected ewes with *Fasciola sp.*

Parameters	Non-infected mean ^a ± S.E.	Infected mean ^a ± S.E.
Haematological parameters:		
Erythrocytes ($10^6/\text{mm}^3$)**	10.96 ± 0.07	06.70 ± 0.08
Leucocytes ($10^3/\text{mm}^3$)**	6.76 ± 0.05	11.28 ± 0.07
Lymphocytes**	4.60	6.76
Neutrophils**	1.86	3.79
Monocytes**	0.10	0.12
Eosinophils	0.17	0.62
Basophils	0.03	0.00
Haematocrit (%)**	30.54 ± 0.13	25.81 ± 0.14
Haemoglobin (gm/100 ml)**	11.38 ± 0.06	8.66 ± 0.11
Mean corpuscular volume (μ^3)**	27.94 ± 0.22	38.54 ± 0.34
Mean corpuscular haemoglobin (μug)**	10.42 ± 0.04	12.90 ± 0.10
Mean corpuscular concentrate	37.36 ± 0.03	33.71 ± 0.34
Serum elements:		
Zinc (ppm)	0.42 ± 0.050	0.15 ± 0.010
Selenium (ppm)	0.03 ± 0.001	0.01 ± 0.003
Ewe's body weight (kg)*	29.54 ± 0.06	27.07 ± 0.10
Number of egg/gm/feaces	0.00 ± 0.00	53.41 ± 2.70

** ($P < 0.01$)

(a) = Mean of 30 animals in each group.

Mean values of blood plasma zinc and selenium concentration of ewes significantly decreased by infection (Table 1). The mechanism by which infection reduces the plasma zinc and selenium levels still has to be investigated. However fasciola infection might interfere with the absorption of such trace minerals and thus reduces their level in the blood.

Ewe's body weight

Results in Table (1) indicate that infected ewes has significantly ($P < 0.01$) low body weight than non-infected ewes. Duwell (1975) and Dargie *et al.* (1979) found that body weight of the infected animals was lower than that of the non-infected animals. Furthermore Chick *et al.* (1980) stated that rate of growth were reduced by 14% in steers infected with fascioliasis.

Number of eggs per gm-feaces reached 53.41 ± 2.70 in infected ewes. Bardie *et al.* (1978) showed a high positive correlation between egg counts and number of *fasciola hepatica* recovered outopsy. The number of eggs recovered increased progressively with the time and tended to be stabilize after the twenty seventh week of infection.

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تأثير الإصابة بالديدان الكبدية على بعض الصفات الهيماتولوجية والبيوكيميائية للنعاج

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استخدمت في هذه الدراسة ثلاثون نعجة مصابة بالديدان الكبدية ومثلها غير مصابة بغرض دراسة تأثير الإصابة على كل من عدد كرات الدم الحمراء وكرات الدم البيضاء وأنواعها المختلفة وكذلك قيمة الهيماتوكريت ومستوى الهيموجلوبين في الدم . كما حسب حجم كل كرة دموية حمراء وما تحتويه من الهيموجلوبين ومتوسط مساحة ما يشغله الهيموجلوبين من مساحة كل كرة . كما قدر مستوى كل من الزنك والسيلينيوم في بلازما الدم . كما قدر وزن هذه النعاج أثناء فترة التجربة .

أوضحت النتائج أن النعاج الغير مصابة بالدورة الكبدية كان محتوى دمها من الكرات الدموية الحمراء مرتفع وأن الفروق معنوية بينها وبين النعاج المصابة . ولكن بالنسبة لكرات الدم البيضاء كان عددها وكذلك أنواعها المختلفة مرتفعا معنويا في النعاج المصابة .

أما بالنسبة لمتوسط قيمة الهيماتوكريت وتركيز الهيموجلوبين فكانا مرتفعا في النعاج الغير مصابة عما هو عليه في النعاج المصابة وكانت الفروق معنوية . وأوضحت النتائج أن متوسط حجم كل كرة دموية حمراء وكذلك ما تحتويه من الهيموجلوبين كان مرتفعا في النعاج المصابة ولكن بالنسبة لمتوسط مساحة ما يشغله الهيموجلوبين من مساحة كل كرة كان منخفضا في النعاج المصابة عنه في غير المصابة .

وأظهرت النتائج أن مستوى الزنك والسيلينيوم كان منخفضا في النعاج المصابة بالديدان الكبدية . وكذلك وزن الجسم كان منخفضا في النعاج المصابة عنه في النعاج الغير مصابة .