قسم : الباثولوجى - معهد بحوث صحة الحيوان بالدقى - الجيزة
رئيس القسم : أ.د / زينب حسنى

دراسات عن بابيزيا الخيول وأهمية الفحص السيتولوجى لدم الخيول والحمير

زينب حسنى ، محمد حافظ ، محمد ادريس

بلغت نسبة الاصابة بالطور المزمن لطفيل البابيزيا فى الفصيلة الخيلية بمصر ٤٦ر٢٦٪ فى الخيول ، ٥١ر٤٤٪ فى الحمير . بين الفحص الدموى ارتفاع فى العدد الكلى لكريات الدم البيضاء وزيادة الخلايا المحبة لحمض (الازينوفيليا) كما تأثرت نسبة خلايا الليمفوسيت والنتروفيل والمونوسيت فى بعض الحالات نتيجة للاصابة بالطفيل .

كما ظهرت بعض التغيرات المورفولوجية فى مكونات الدم فى ٢ر٥٩٪ فى الحالات الغير مصابة بطفيل البابيزيا وكانت التغيرات المحدثة متعلقة بكريات الدم البيضاء سواء فى عددها الكلى أو نسبتها المطلقة .

Dept. of Pathology,
Animal Health Reserach Institute, Dokki,
Head of Dept. Prof. Dr. Z. Hosny

ON EQUINE BABESIOSIS: SIGNIFICANCE OF BLOOD CYTOLOGICAL EXAMINATION OF HORSES AND DONKEYS

(With One Table)

By

Z. HOSNY, M.A.M. HAFEZ and M. EDRIES

(Received at 18/6/1980)

SUMMARY

The high incidence of latent B.equi infection in Egyptian equines was high and constitute respectively 46.29% and 51.44% of examined horses and donkeys. The haematological examination showed severe to slight leukocytosis with eosinophilia. In some individuals lymphocytes, neutrophils or monocytes were reacted against B.equi infestion.

A percentage of 59.2 of apparently healthy Babesia non-infected equines revealed some morphological changes in their circulating blood. The deviation from normal values was related mainly to the leukocytes either in their total count or in the ratio. The haematological values obtained were discussed.

INTRODUCTION

The most common blood parasites that invade red blood corpuscles of equines in Egypt is Babesia equi. According to the reports of ZOVAGLI (1970) and ABOLADZIE (1973), the parasite led to a disease with severe clinico-pathological manifestations including fever, anaemia and icterus with or without haemoglobinurea and may end fatally. However, in endemic areas, infected animals seldom show clinical symptoms.

The clinico-pathological studies on Egyptian equines during B. equi infection were still inadequate. Hence, the morphological exmination of the blood of latently infected equines with B. equi is found to be nessecary.

MATERIAL AND METHODS

Blood samples were collected from the jugular vein of 54 native breed horses and 138 donkeys. E.D.T.A. in the proper amount was used as anticoagulant.

The erythrocytic and leukocytic count were calculated in double improved Neubauer chamber using Hayems and Turk's solutions respectively (COLES, 1974). The haemoglobin concentration was determined by cyanomethemoglobin method using the spectrophotopeter spectronic 20 (OSER, 1965). Thin blood films were made and stained with Giemsa stain (SCHALM et al., 1975). This was planned to clarify the presence of parasite in RBCS and for the differential leukocytic count. Different white cells were identitied after four-field Meander method. The percentage and the absolute values for each type were calculated.

Statistical analysis showing the maximum, minimum, mean and standard error for each variable were calculated according to SNEDECOR (1956).

RESULTS

Twenty five out of 54 as well as 71 out of 138 examined horses and donkeys were latently infected with B. equi. The degree of parasitaemia did not exceed one parasite per 1000 red blood corpuscles.

The haemogram of the apparently healthy non-infected horses and donkeys with those infected with B. equi showed in the represented table (1).

1) Blood picture in horses:

The erythrogram showed no significant changes in infected group with B.equi when compared with the non-infected animals. Those horses infected with B. equi and possessed less than 8 millions RBCS/cmm. were 10 individuals constituting 40.6% of the total examined animals. Erythropenia (2.21 - 4.00 millions/cmm.) was also observed in about 14% of non-infected horses with blood parasites. The haemoglobin concentration was consequently decreased.

Leukocytosis developed in 10 out of 25 infected horses where the count reached 13,00-16,000/cmm. Some changes was also encountered in the ratio between the different elements of leukocytes. Thus, about 40% of the horses infected with B. equi possessed absolute number more than 5000 (the accepted physiological levels of neutrophils in healthy horses) The wide range of absolute neutrophils count in non-infected horses reached 7147.69 ± 5198.82 cell/cmm. Therefore, the interpretation of our results is rather diffecult. The absolute number of eosinophils in infected horses was 695 cell/cmm. which exceeded slightly the non-infected group (575 cell/cmm.). The absolute count of these type of cells in normal animals amounts 266 cells. yet, with comparison we can observe markedly that 19 animals reacted and possessed more than 400 cells constituting a percentage of 76% of the population

The picture was not markedly clear in non-infected animals having more than 400 cells (59.2% of examined horses) Other types of cells were not significantly changed.

2) Blood picture in donkeys:

In naturally infected donkeys with B. equi (71) the mean RBCS count was 5.63 ± 2.44 millions/cmm. The wide range of the red cells among this species in normal animals made the interpretation of this figure rather difficult because it approached the mean level of the non-infected group. However, by screaning the individual values of infected animals, it was found that 12 (16.9%) showed a decrease in the total erythrocytic count to 2.44-3.99 million cell/cmm.

The haemoglobin concentration (6.50 - 7.84 gm%)behaved in a rather similar manner, however, the changes were also not significant

Wide variations in the leukogram of infected donkeys was observed. In 12 animals (16.9%) the count reached 14.95 15.70 thousands/cmm. while in other 13 animals (18.30%)the range was wide as 16.35 - 24.20 Thousands/cmm. Such figures were also encountered in 12.30% of non-infected donkeys.

Moderate neutrophilia was observed in infected and non-infected donkeys. In three infected individuals(4.2%) neutrophilia reached to 12100 cell/cmm. Moderate eosinophilia was also observed in all values, which reached up to 4525 cell/cmm. Those animals which possessed more than 1000 cell/cmm. were 42 individuals (59.15%). The mean absolute count of lymphocytes for both infected and non-infected groups did not show any significant changes. However, 13 individuals (18.3%) had a count more than 8000 and in some cases reached 12238 cell/cmm. The mean values of absolute counts of monocytes pointed out that infected animals exceeded those of the non-infected ones.

DISCUSSION

It seemed from the present results that a high incidence of B. equi infection among our native breed horses exists where it had reached 46.29% and in donkeys 51.44%. All, these animals proved to be suffering from the latent form of the disease Some alterations in the haemogram of these animals was observed. The oligocythemia (3.99 millions/cmm.) was detected in 12 out of the 71 infected horses. This could be attributed to the destruction of erythrocytes with a release of haemoglobin and consequantly varying degrees of anaemia. In some cases,no significant variations were shown and may be related to the state of premunition. SIPPEL et al. (1962) and ROGERS (1971) concluded that the degree of anaemia depends upon the severity and course of the disease.

Leukocytosis and eosinophilia were the most common changes in the haemogram of infected animals with B.equi. In some individuals severe lymphocytosis, neutrophilia or monocytosis were observed. ARCHER (1963) and SABESIN (1963) explained in details the role of eosinophils in the defense mechanism of organism against parasites. Moreover, NEITZ (1938) stated that the increase of lymphocytes might be due to its classical function as a defensive mechanism which usually comes in important after neutrophils.

The blood picture of non-infected individuals with B. equi was rather similar to that of infected animals to the extent that one hardly interpret the finding on solid basis.The available literature was lacking too much the haemotological values of healthy horses and donkeys, yet we could only refere to BOTROS et al.(1970) and SCHALM'S et al. (1975) figures in hot-blooded breeds. Moreover, in our study leukocytosis with eosinophilia or with slight lymphocytosis characterized respectively the leukogram of 59.20% and 56.72% of apparently healthy non-infected horses and donkeys. An explanation could be offered in this respect that under the variable conditions including diet, infestation and other factors the changes may not be specific. SOLIMAN and EL REFAII (1965) reported leuko-

cytosis with neutrophilia, eosinophilia and lymphopenia in about 80% of Egyptian horses infected with Strongylus and Ascaris equorum, a fact of great importance.Such stress may influence the result in recently infected animals with B. equi.

Evaluating the obtained results in apparently healthy non-infected horses and donkeys and those infected with B. equi. it could be concluded that the blood picture of equines in Egypt is a matter of deplete and should be infront of all those who work in the field of equine haematology.

REFERENCES

Aboladzie, K.U. (1973): Infazuon. Balizni Sel'shokhoz. Jefotni. Moscow.

Archer R.K. (1960): The biology of the eosinophil leukocyte. Vet. Rec. 72: 155-159.

Botros, B.A.M.; Awad, A.Y.; Kozman, A.R.; Hildebrandt, P.K. and Maronpot, R.R. (1970): Haematologic, blood electrolytes, and blood biochemicals values of Egyptian domesticated animals. J. of Arab. Vet. Med. Assoc., 25 (1-2), 53-61.

Coles, E.H. (1974): Veterinary clinical pathology. 2nd Ed., W.B. Saunders company, philadelphia, London, Toronto.

Neitz, W.O. (1938): The destruction of Piroplasma canis by the neutrophils and large mononeuclear leukocytes. Onder. J. Vet. Sci. 10, 33-36.

Oser, B.L. (1965): Hawk's physiology chemistry. 14 th Ed. Mc Graw-tlill company, 1096 - 1097.

Rogers, R.J. (1971): Observations on the pathology of Babesia argentina. Aust. Vet. J.; 47, 242-247.

Sabesin S.M. (1963): A function of the eosinophil: phagocytosis of antigen-antibody complexes. Proc. Soc. Exp. Biol. (N.Y.). 112: 667-670.

Sahalm, O.W.; Jain, N.C. and Carroll, E.J. (1975): Veterinary Haematology. 3 rd Ed. Lea & Pebiger, Philadelphia.

Sippel, W.L., Cooperrider, D.E., Gainer J.H. Allen, R.W., Mouw, J.E.B. and Teigland M.B. (1962): Equine piroplasmosis in the united states. J. Amer. Vet. Med. Assoc., 141 (6): 694-698.

Soliman, M.K. and El Refaii, A.H. (1965): Some haematological studies on healthy and nematode infected horses. J. of Arab. Vet. Med. Assoc., 25 (3): 93-100.

Snedecor, G.W. (1956): Statistical methods, 4 th Ed., The Iowa State College Press, Ames, Iowa.

Zavagli, Y. (1970): Proc. 2 nd Int. Conf. Equine Infect. Dis., Paris 1969, PP. 244-248. Cited by Blood D.C. and Henderson, J.A. (1974): Veterinary Medicine. 4 th Ed., Bailliere Tindall London.

Comparative statistical analysis of the blood picture values in non-infected and infected horses and donkeys with B. equi.

Haematilogical values		Mean values together with their standard errors (Non-infected) (29 horses)	Infected (25 horses)	Difference of means and significance of "t" test (x)	Mean values together with their standard errors (Non-infected) (67 donkeys)	Infected (71 donkeys)	Difference of means and significance of "t" test (x)
RBCS	10^6/cumm.	7.58± 2.93	8.49± 3.87	0.155	5.30± 1.40	5.63± 2.44	0.12
HB	gm %	11.73± 2.52	10.55± 1.81	0.22	11.83± 2.24	11.90± 2.12	0.008
WBCS	10^3/cumm	9.82± 2.58	10.63± 3.78	0.17	13.57± 3.59	13.30± 3.91	0.08
Differential leucocytic count							
Polymorph	Relative %	48.62± 10.72	42.72± 10.50	0.39	33.85± 30.24	38.36± 11.01	0.02
	Absolute	7147.69±5198.32	4497.20±3646.58	0.42	5271.43±2199.50	5615.02±2516.23	0.103
Stab	Relative %	0.06± 0.24	0	0.26	0	0.08± 0.26	0.31
	Absolute	6.06± 23.66	0	0.25	0	9.43± 32.50	0.29
Eosinophils	Relative %	5.75± 3.35	7.40± 5.13	0.057	9.68± 6.04	11.46± 5.96	0.20
	Absolute	575.69± 270.30	695.68± 122.91	0.80	1290.61± 859.50	1441.72± 616.33	0.05
Basophils	Relative %	0.38± 0.67	0.24± 0.51	0.17	0.14± 0.44	0.11± 0.44	0.048
	Absolute	38.34± 68.07	21.92± 52.78	0.19	21.88± 67.02	16.92± 61.05	0.0555
Lymphocytes	Relative %	43.17± 9.33	47.04± 9.69	0.28	49.29± 16.00	47.51± 9.18	0.096
	Absolute	4258.10±1659.59	4809.52±3249.19	0.28	6695.11±1127.82	6203.10± 631.80	0.778
Monocytes	Relative %	2.00± 2.00	2.20± 2.48	0.04	1.43± 1.32	1.86± 2.12	0.172
	Absolute	210.27± 176.48	180.96± 151.67	0.12	187.55± 259.00	233.75± 511.83	0.08

(x) Significantly different at 0.05 level of probability.