Vet. Med. J., Giza. Vol. 46, No.2. (1998):155-163.

SOME STUDIES ON BUFFALO SARCOCYSTOSIS WITH REFERENCE TO THE BIOCHEMICAL ALTERATIONS

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Received: 8/11/1997
Accepted : 22/12/1997

SUMMARY

Two hundred and seventy buffalo's oesophagus muscle samples collected from Giza abattoir were examined macroscopically and microscopically for the presence Sarcocystis. The results indicate the presence of macroscopic Sarcocystis fusiformis at the rate 88.9% and microscopic Sarcocystis at the rate of 85.5% by the compressorium method and 93.3% by the use of tyrosine digestion technique. The incidence of infection with both species was 93%. The morphological features of the demonstrated Sarcocystis species and the liberated merozoites were described.

At the same time blood samples were taken from the same animals and sera were separated for the estimation of total protein, urea, uric acid, calcium, inorganic phosphorus and magnesium levels together with alkaline phosphatase and alanine amino-transpherase activities. The results indicate significant decrease in total protein level and significant increase in both alkaline phosphatase and ALT activities. Minor insignificant changes were observed in the other investigated parameters.

INTRODUCTION

Water buffaloes are the most important farm animals in Egypt, as they constitute one of the main sources of high quality meat, milk and hindes for Egyptians.

Parasitic infestation is one of the ill health problems affecting the general condition of water buffaloes causing great economic losses in productivity or may even lead to death (Nassar, 1982).

Sarcocystis is one of the prevalent parasitic

infections of water buffaloes allover the world (Nassar, 1982; Manuel et al., 1983; Ghoshal et al., 1986 ; XIAO et al, 1988 and Nguyen, 1995). It causes loss of weight, weakness, anaemia, recumbence and death in calves and in dairy heifers (Frelier et al., 1979).

Giles et al. (1980) observed grey white foci in skeletal muscles and thickened fibrous , generalized lymphodenopathy, erosions in oral cavity and oesophagus and laminitis in cows.

Many studies were done on experimental infection in most species of animals to determine the morphology (Tongson and Molina, 197 9), life cycle (Dubey et al., 1981) and effect of Sarcocystis (Fayer and Lunde, 1977).

The current study was conducted to investigate the incidence of Sarcocystis in water buffaloes, morphological picture of demonstrated parasites with the estimation of some serum constutuents in naturally infected buffaloes.

MATERIAL AND METHODS

Collection of samples:

Oesophagus muscle samples were collected from each of 270 freshly slaughtered water buffaloes over 5 years old at the main slaughter house in Giza. At the same time about 15 ml blood was collected from each animal in a dry clean stoppered MacCartiny bottle during slaughtering of these animals and left to clot. Clear sera were separated and stored at 20° C unless they were used immediately for analysis.

Examination of samples:

Each oesophagus muscle sample was exa
macroscopically and microscopically
presence of Sarcocystis. Dimensions of the
dissected macroscopic Sarcocystis fus
cysts were measured under sterobi
microscope. The detected cysts were crus
slides and their contents were diluted wi
drops of saline, dried and fixed by methyl
for 3 minutes then stained with Giem
examined under microscope for merozoites.

Two methods were used for the detect
microscopic cysts:

1) By the use of compressorium (El-Afifi
1963), from each sample 10 small pieces
the size of a rice seed were pressed be
two plates of compressor and examined
microscope.

2) By the use of trypsin digestion tech
(Erber, 1977). In which 10 grams of m
samples were added to 100 ml of t
solution in phosphate buffer (2.5g/L
stirred with magnetic stirrer for two hours
sieved and centrifuged at 3000 rpm for 1
Fine smears were done from the sediment
dilution with equal amount of saline
stained with Giemsa to be examined u
the microscope for detection of the libe
merozoites.

Serum analysis:

The collected serum samples were used fo

estimation of total protein according to the method described by Weichselbum (1946), uric acid as mentioned by Artiss and Entwistle (1981), urea as recorded by Patton and Crauch (1977), inorganic phosphorus according to the method described by Kilchling and Freiburg (1951), magnesium according to the method mentioned by Niel and Neely (1956), calcium as recorded by Baron and Joyce (1957), alkaline phosphatase as recorded by Belfield and Graldbery(1971) and alanine aminotranspherase (ALT) was carried out according to Reitman and Frankels (1957).

Statistical analysis and evaluation of the obtained results wre carried out according to Snedecor and Cochran (1980).

RESULTS AND DISCUSSION

The present study showed that 252 out of 270 (93.33%) buffaloes slaughtered in Giza abattoir were found to be infected with both macroscopic and microscopic sarcocystis cysts (Table 1). Similar findings at Cairo abattoir were recorded by Nassar (1982) who recorded that the incidence of both macroscopic and microscopic infection in buffaloes was 97%. At Giza abttoir the reported macroscopic Sarcocystis in buffaloes over 5 years old were 88.9% (240 out of 270) while it was 90.8% at Cairo abattoir (Nassar, 1982). Regarding the incidence of microscopic sarcocystis species , it was found to be 231 (85.5%) with compressorium method and 252 (93.3%) when trypsin digestion technique was applied as shown in Table (1). Nassar (1982) stated that microscopically, it was 87.3% by trichinoscope and 97.7 by trypsin digestion. The higher incidence of sarcocystis in case of trypsin digestion technique compared to that of compressorium method can be atributed to the undetectable small sized cysts of Sarcocystis which escaped diagnosis by compressorium method. The macroscopic examination of the sarcocystis revealed that they were opaque white in colour, spindle shaped measuring 0.3-2.8cm in length and running parallel to longitudinal axis of the muscles (Fig.1) . The same morphology was recorded by Chauhan et al. (1978) and Nassar (1982). The microscopic sarcocystis reported here were spindle shaped, running parallel to the muscle fibers. Their walls were thin and smooth , internally they were divided by septae. They varied greatly in size from 117 to 430um in length and from 26.5 to um in breadth (Fig.2). Similar description was given by Dissanaike and Kan (1978) and Nassar (1982).

The merozoites observed here in both macroscopic and microscopic sarcocystis were banana shaped with one end more pointed than other. Their diameters were (15.5-17.4) x (3.7-5.9)um (average 16.5 x 4.8 micron) and (17.1 - 17.8) x (4.1-4.3)um average 17.4x4.2 respectively. The nucleus was located near the broader end and the cytoplasm contained some fine granules (Fig.3 and 4). These findings were in consistence with the findings of Abdel Ghaffar et al. (1978), Dissanaike and Kan (1978) and Nassar (1982).

Table (2) shows the estimated values for serum total proteins, uric acid, urea, inoragnic phosphorus, magnesium and calcium levels

together with alkailine phosphatase and ALT activities. The tabulated resulted revealed significant decrease in total protein level and significant increase in both alkaline phosphatase and ALT activities while the other parameters were insignificantly changed compared to that recorded in the uninfected animals. The significant decrease in total protein level compared to control non infected buffaloes was similar to the results recorded by Fayer and Lunde (1977); Leek et al. 1977 and Dubey et al. (1981) in experimentally infected lambs, calves and goats. However , Mahrt and Fayer (1975) and Dessouky et al. (1984) recorded minor changes in the level of total protein which was significant.

Regarding the uric and urea concentrations insignificant elevations were recorded in their levels (Table 2). The results were recorded by Mahrt and Fayer (1975) who found insignificant increase in urea levels in experimentally infected calves and they attributed the elevation to the degenerative changes observed in liver and kidney. Also Dessoky et al. (1984) recorded minor changes in urea level, while Prass and Fayer (1981) demonstrated increase in urea ascribed these changes to destruction of red cells.

The insignificant elevation in serum inor phosphorus magnesium and calcium levels be attributed to destrcution of some mus cells, due to infection and the leak of contents into the serum.

No available literature dealing with measurements were found:

The obtained data revealed significant rise alkaline phosphatase and ALT activities. elevation can be attributed to liver and n affection (Coles, 1974). Similar findings recorded by Dubey (1981) who recorded in in serum alkaline phosphatase and ALT act in experimentally infected dogs, whil experimentally infected goats Dubey et al. (found and elevation in ALT and no chan alkaline phosphatase activity. On the Dessouky et al. (1984) recorded minor chan the activity of both alkaline phosphatas ALT.

Table (1) Incidence Of Macroscopic Visible Cyst And Microscopic Sarcocystis Species Cysts Among Buffaloes In Giza Abattoir.

No. of animals	Age	% of animal infected with both species	% of animals infected with Macroscopic cysts	% of animals infected with microscopic cysts	
				by compressorium	by trypsin digestion
270	> 5 years	93 %	88.9 %	85.5 %	93.3 %

Fig. (3) Merozoites of *S.fusiformis* x 1250

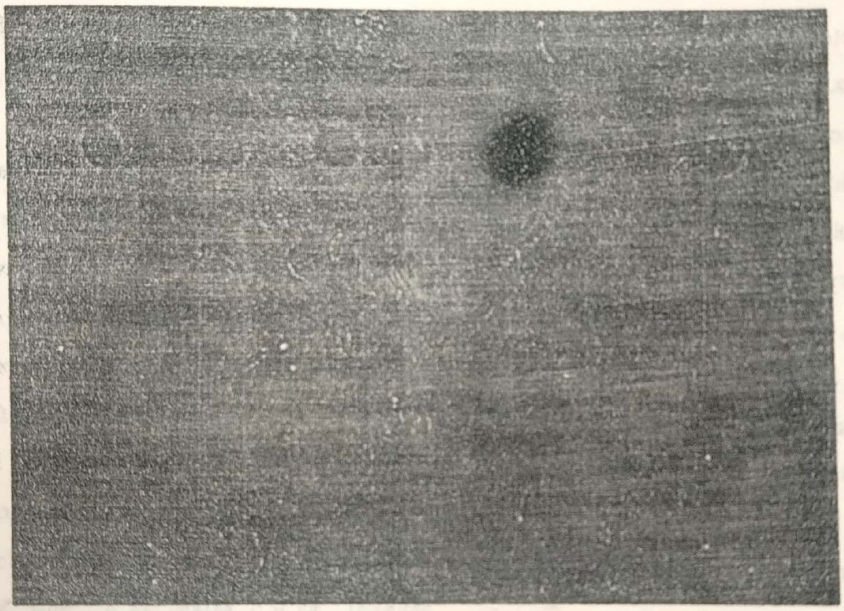

Fig. (4) Merozoites of Sarcocystis spp liberated from the digested oesophagus samples (40 x 12.5)

Table (2) Serum Total Protein, Uric acid, Urea, Phosphorus, Magnesium, Calcium level and Alkaline Phosphatase and ALT Activities in Infested and Non infested Buffaloes

	Infested mean ± SE	Control mean ± SE
Total protein g / 100 ml	* 8.1 ± 0.64	9.65 ± 0.22
Uric acid mg / 100 ml	0.632 ± 0.02	0.615 ± 0.06
Urea mg / 100 ml	0.31 ± 0.06	0.29 ± 0.03
Phosphorus mg / 100 ml	5.348 ± 0.31	4.86 ± 0.9
Magnesium mg / 100 ml	2.616 ± 0.34	2.45 ± 0.4
Calcium mg / 100 ml	11.206 ± 0.72	10.94 ± 0.61
Alkaline Phosphatase i.u. / 100 ml	*** 4.16 ± 0.16	2.65 ± 0.22
ALT u / ml	*** 42.275 ± 0.6	22.67 ± 1.75

* $P \geq 0.05$

*** $P \geq 0.001$

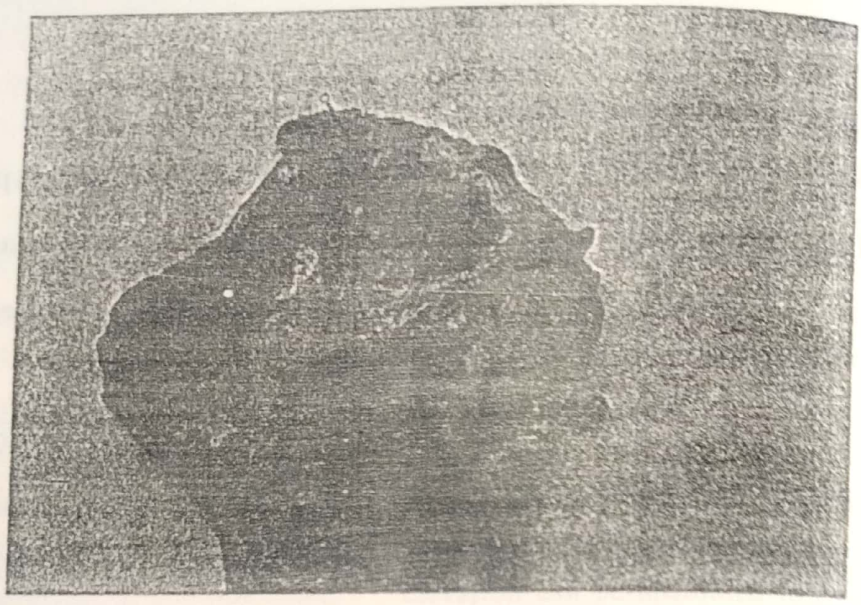

Fig. (1) Macroscopic Sarcocystis cyst in oesophagus of naturally infected buffaloes.

Fig. (2) Microscopic Sarcocystis species cyst in oesophagus of naturally infected buffaloes (40 x 12.5).

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