

TOXOPLASMOSIS, BALANTIDIASIS AND AMEBIASIS AMONG, ZOO-ANIMALS AND MAN

(With 3 Tables)

By

H.A. SAMAHA; A.H. EL-GOHARY and A.A. DRAZ

(Received at 31/3/1993)

مرض التوكسوبلازموزيس والبالانتيريازيس والدوسنتاريا الالهيبية بين حيوانات حديقة الحيوان والانسان

جامعة سجاية ، عايل الجوهري ، عيب الماچير براز

فى هذا البحث تم دراسة وجود الأجسام المناعية لمرض التوكسوبلازموزيس حيث تم جمع عدد ٢٠ (عشرون) عينة دم من بعض حيوانات حديقة الحيوان بالجيزة وتم فحص عينات السيرم التى تم فصلها سيروlogيا باستخدام اختبار التحلط الغير مباشر الدموى .
وقد اسفرت النتائج عن وجود مرض التوكسوبلازموزيس بنسب مختلفة فى تلك الحيوانات كالآتى :-

- نسناس باتاس ٣ ر ٢٣ % - غنم ارواى ٢ ر ٢٢ %

- قرد حبشى ٢ ر ٢٢ % - مكك برتغالى ١ ر ١١ %

- قرد ابيض الانفا ١ ر ١١ %

وكانت النتائج سلبية فى حالة القرد المنجابى والعبنج السودانى .

اما فى حالة عمال الحديقة فقد كانت نسبة الإصابة ١٥ % .

هذا وقد تم جمع ١٣٦ عينة براز من حيوانات الحديقة للفحص الباراسيتولوجى وقد اسفرت النتائج عن وجود طفيل البالانتيدوم كولاى فى حيوان الشيمبانزى بنسبة ١٠٠ % وكذلك طفيل الأنتاميبا هستوليتكا بنسبة ٢ ر ٧٢ % ، ٧ ر ١٦ % ، ١٠ ر ١١ % فى كل من القرد الحبشى والشيمبانزى وانسان الغابة على الترتيب .
مذا وقد نوقشت الأهمية المشتركة للطفيليات التى تم فحصها ومدى تأثيرها على صحة الإنسان .

SUMMARY

The incidence of Toxoplasmosis, Balantidiasis and Amebiasis in Zoo animals and man were studied in Zoo garden, Giza-Egypt. Faecal samples were collected from man and Zoo animal for detection of *Balantidium coli* and *Entamoeba histolytica* by microscopical examination, and blood samples were collected from Zoo animals and man for detection of Toxoplasma antibodies by Indirect Haemagglutination Test (I.H.A.T). The incidence of Toxoplasmosis in workers and attendants were 15%. In addition, 136 faecal samples were collected from different Zoo animals and subjected to parasitological examination, *Balantidium coli* were found infesting Champanzee with an incidence of (100.0%) and *Entamoeba histolytica* were investigated in Babons monkeys, Champanzee and Orangutans at percentages of 72.2, 16.7 and 11.1% respectively.

INTRODUCTION

The importance of zoo-animals as a reservoir of some zoonotic parasitic diseases has attracted the attention of many zoological research workers all over the world (REMINGTON, 1962; CANNON, 1974; OERTLEY and WALLS, 1980; SACKS, et al., 1983 and PATTON, et al., 1986) who could investigate certain parasitic zoonotic agents which have been demonstrated in both Monkeys and Champanzee (*Pan satyrus*) and man such as *Toxoplasma gondii*, *Balantidium coli* and *Entamoeba histolytica* among zoo and wildlife species.

The aim of the present work was initiated in-order to provide additional data that would lead to a better understanding the wildlife Toxoplasmosis, Balantidiasis and Amebiasis (Amoebic dysentery) at Giza Zoo in Egypt and in people at risk of infestation.

MATERIAL AND METHODS

I- Collection of faeces:

A- Detection of Balantidiasis and Amebiasis:

1- Collection of faecal samples:

10 gm of faecal samples were collected directly after defecation from the different investigated zoo-animal cages.

Each sample was immediately transferred to clean nylon bag labelled with species of the animal and date and transported as soon as possible to the laboratory for parasitological examination according to Thieupent, et al., (1979).

II- Detection of Toxoplasmosis:

1- Sampling and preparation of blood samples:

Twenty blood samples were collected freshly from different species of zoo-animals at Giza Zoo in Egypt, Vervet monkeys (6), Batase (5), Arway sheep (2), Babons monkey (2), White nosed monkeys (2), Macaque Bengal (2) and Mengaby monkey (1). In the same time, 100 blood samples were collected from workers and attendants (men) of various ages at high risk to infection.

Blood samples were collected in a centrifuge tube (15 ml capacity). About 6-8 ml of blood was collected from the tail vein of each zoo-animal. In addition 6 ml of blood was collected from radial vein of workers and attendants in a sterile cleantest tube using sterile disposable syringe at Giza-Zoo.

All blood samples were then labelled with the species and the date of collection. The samples were left for about an hour for blood clotting to occur. The clot was then separated with a fine loop and the tubes were centrifugated at 3500 r.p.m for at least 5 minutes. The supernatant clear sterile fluid (serum) was aspirated with a Pasteur pipette and put in a sterile scrow capped vial and stored at -30 C up to the time of testing of such samples.

2- Indirect Haemagglutination Test (I.H.A.T.):

The obtained sera were tested against *Toxoplasma gondii* antigen which was obtained from the Laboratory of Veterinary Research, Dokki and examined serologically by using I.H.A.T as recommended by JACOBS and LUNDE (1957).

RESULTS

Results are summarized in the Tables 1, 2 and 3.

DISCUSSION

Toxoplasmosis is considered as one of the major public health significant disease among our population caused by the protozoan parasite occurring naturally in man as well as warm blooded wild and domesticated animals (WEINMAN and CHANDLER, 1956). The infection may be congenital or acquired. The acquired from may be contracted through ingestion or getting in contact with infected material (EL_AYAT, et al., 1985).

The data presented in table (1) showed the presence of *Toxoplasma gondii* antibodies in the blood of 9 zoo-animals from a total 20 of different species with a percentage of 45% and it is clear that the incidence was found to be 33.3, 22.2, 22.2, 11.1, 11.1, 0.0 and 0.0% in Batase, Arway sheep, Babons monkey, Macaque Bengal, White nosed monkey, Mengaby monkey and Vervet monkey respectively. Zoo-animals were specially prone to contracting toxoplasmosis because of stress of captivity and the proximity of wild and domesticated cats (PATTON, et al., 1986). Zoological animals can become infected from exposure to faeces of wild domesticated cats that may be shedding the oocyst stage of the parasite or from being feed raw meat containing bradyzoite-tissue cyst stage (DREESEN, 1990).

The obtained results clearly explain the potential health hazards of the different zoo-animals as active carriers of *Toxoplasma gondii*. However, the spreading of *Toxoplasma* infection among zoo-animals depends mainly upon certain climatic conditions such as temperature, moisture and aeration of the soil which are the most important factors favouring the sporulation of *Toxoplasma* oocysts and the survival of the infections sporozoites (WALTON, et al., 1966).

The incidence of toxoplasmosis in the examined workers and attendants, in contact with such zoo primates, was found to be 15% (Table 2). The possibility of toxoplasmosis infection may exist to the contamination of food by filth, flies and cockroaches (WALLACE, 1971 & 1972). The bad habit of licking the fingers during handling and processing foods may constitute an additional responsible factor in the transmission of such disease (SCOTT, 1978).

Balantidiasis was usually an endemic disease of sporadic nature (KNIGHT, 1978), caused by a ciliated protozoan named *Balantidium coli* with a world wide distribution (FLYNN, 1973). Balantidiasis in man, whether endemic or epidemic, usually was related to exposure to contaminated food or water (RADFORD, 1973) and primate such as Gorilla.

Balantidium coli also been recorded in various other wild animals as well. an, is relatively rare host to *Balantidium* (Marsden and Schultz, 1969). The results of the present work indicate that the *B. coli* was only isolated from the Champanzee at an incidence of 100.0% (Table 3). This finding was in agreement with the results reported by Andrew & Michael, 1982). Balantidiasis in man, whether endemic or epidemic usually is related to exposure to contaminated food or water (Zaman, 1978).

TOXOPLASMOSIS, BALANTIDIASIS, AMEBIASIS, ZOO-ANIMALS & MAN

Amebiasis was a disease of world wide occurrence caused by *Entamoeba histolytica* which was primarily amongst man and higher primates (W.H.O., 1964).

From the foregoing data, it is clear that *Entamoeba histolytica* was isolated from Babon monkey, Champanzee and Orangutans at incidence of 72.2, 16.7 and 11.1% respectively (Table 3). On the other hand *Balantidium coli* and *Entamoeba histolytica* could not be isolated from Grevet monekey., Verve, monekey., Black mengaby, Mandrill, White nosed monekey., pig tailed monekey., Batase, Yellow babone, Mengaby monekey., Jebon, Macagae, Capuchin, Lemurs, polar beer, Hemalian beer and Brown beer.

From the above mentioning results and discussion it can be concluded that toxoplasmosis in man is likely to be occupationally as recommended by Blood and Henderson (1983).

REFERENCES

- Anderw, J.T. and Michael, R.L. (1982): Epizootic of balantidiasis in lowland gorillas. J.A.V.M.A., Vol. 181, No. 11, 1345-1347.
- Blood, D. and Henderson, A. (1983): Veterinary Medicine A text book of The Disease Of Cattle, Sheep, Pigs, Goats and Horses. 6th Ed. Bailliere and Tindall.
- Cannon, J. (1974): Case report: Toxoplasmosis in Cheetahs, In Proceeding. Am. Assoc. Zoo. Vet. 255-257.
- Dreesen. D.W. (1990): Toxoplasma gondii infections in wildlife. JAVMA. Vol. 196, No. 2: 274-276.
- El-Ayat, A.A.; Hegazy, M.M.; Makhlouf, L.M. and El-Hamshary, E.M. (1985): Toxoplasmosis amonge people at risk of infection in Ismailia city. Alex. J. Vet. Sci., Vol. 1 No.2: 174-180.
- Flynn, R.J. (1973): Parasites of Laboratory Animals. Ames, The Iowa State Univ. Press., 114-115.
- Jacobs, L. and Lunde, M.N. (1957): The indirect haemagglutination test in diagnosis of toxoplasmosis. J. Parasit. 43: 308-310.
- Knight, R. (1978): Giardiasis, Isosporiasis and Balantidiasis. Clin. Gastroenterol., 7: 31-47.
- Marsden, P.D. and Schultz, M.G. (1969): Intestinal Parasites. Gastroenterology, 57, 724-750.
- Oertley, K.D. and Walls, K.W. (1980): Prevalence of antibodies to Toxoplasma gondii amonge bobcats of West Virginia and Georgia. J. Am. Vet. Med. Assoc. 177: 852-853.

- Patton, S.; Johnson, S.L. and Loeffler, D.G. (1986): Epizootic of toxoplasmosis in Kangaroos, Wallabies and Potoroos: Possible transmission via domestic cat. J. Am. Vet. Med. Assoc. 189: 1166-1169.
- Radford, A.J. (1973): Balantidiasis in Papua. New Guinea. Med. J. Aust. 1: 238-241.
- Remington, J.S. (1962): A serological survey in three species of monkeys for antibodies for toxoplasma. American J. Trop. Med. Hyg. 14: 724-726.
- Sacks, J.J.; Delgado, D.G. and Lobel, H.O. (1983): Toxoplasmosis infection associated with eating undercooked venison. Am. J. Epidemiol. 118: 832-838.
- Scott, R.J. (1978): Toxoplasmosis. Tropical Diseases Bulletin. 75, 9, 809-827.
- Thieupent, D.; Rochette, F. and Vanparijs, O.F.J. (1979): Diagnosing Helminthiasis Through Coprological Examination. Jausen Research Foundation, Belgium, 15.
- Wallace, G.D. (1971): Experimental transmission of *Toxoplasma gondii* by filth-flies. Am. J. Trop. Med. Hyg. 20, 411-413.
- Walton, B.C.; Deanjona, I. and Benchoff, B.M. (1966): Relationship of *Toxoplasma* antibodies and altitude. Am. J. Trop. Med. Hyg. 15, 492-495.
- Weinman, D.M. and Chandler, A.H. (1956): Toxoplasmosis in man and swine: An investigation of the possible relationship. J.A.M.A. Vol. 161, No. 3, 229-232.
- W.H.O. Expert Committee Report (1964): Amebiasis. W.H.O. Tech. Rep. Ser. No. 421.
- Zaman, V. (1978): *Balantidium coli*, in Krier: Parasitic Protozoa. New York, Academic Press Inc. Vol. 2, 633-653.

Table (1) : Serological incidence of *Toxoplasma gondii* infection in Zoo-animals by using I.H.A.T.

Family Name	No. of Zoo-animals examined	I.H.A.T.	
		†ve	%
F. Cercopithecidae			
1- Babons monkey	2	2	22.2
2- Vervet monkey	6	-	0.0
3- White nosed monkey	2	1	11.1
4- Batase	5	3	33.3
5- Mengaby monkey	1	-	0.0
F. Cibaedae			
1- Macaque Bengal	2	1	11.1
F. Ovis			
1- Arway sheep	2	2	22.2
Total	20	9	100.0

TOXOPLASMOSIS, BALANTIDIASIS, AMEBIASIS, ZOO-AVIMALS & MAN

Table (2) : Serological incidence of *Toxoplasma gondii* infection of naturally high risk people at Giza-Zoo by using I.H.A.T.

No. of examined persons	No. of +ve	No. of -ve	+ve %
100	15	85	15.0

Table (3) : Incidence of zoonotic intestinal protozoa of zoo-primates at Giza-Zoo in Egypt.

Family Name	Total No.	Bal. coli +ve %	E. histolytica +ve %
F. Cercopethecidae :			
Babons monkeys	16	- 0.0	13 72.2
F. Pongidae :			
Champanzee	8	8 100.0	3 16.7
Orangutans	2	- 0.0	2 11.1
Total	26	8 100.0	18 100.0

Bal. coli = Balantidium coli

E. histolytica = Entamoeba histolytica