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USE OF ANTI-TUBERCULOUS DRUGS IN ZOO ANIMALS FOR CONTROLLING INCIDENCES OF TUBERCULOSIS

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INTRODUCTION

Mycobacterium tuberculosis infection in captive wild animals of Zoological Gardens, Deer parks, Sanctuaries etc. is common. This has profound implications as it is not only a fatal disease but also a disease of zoonotic importance.

Fowler (1978) reported that administration of streptomycin and isoniazid therapy to control the disease in artiodactyla positive reactors became non-reactors. When treatment was stopped, however, animals often became to positive reactors. The problems of isoniazid therapy have also been recorded by him.

Davis *et al* (1981) in USA isolated the three strains of *Mycobacterium* from wild mammals maintained in captivity :

1. *Mycobacterium bovis:-* Out of 261 tissues suspected of having tuberculous lesion on necropsy, they isolated 74 cases of *M. bovis* which was accounted for the greatest number of isolations. Twenty six . *M. bovis* isolates were from monkeys, 13 from deer, 12 from Kudus, 8 from Llama, 5 from antelopes , 3 from Bisons, 2 from Baboon, 2 from Situtunga and one each from an Elk, and Eland and a Tapir.

2. *M. tuberculosis:-* The human strain of tubercle bacilli were isolated from 28 animals in 9 states of USA. 21 isolates were from monkeys, 4 from Oryx, 2 from Addax and 1 from an Elephant.

3. *M. avium:-* The avian tubercle bacillus was isolated from 54 exotic mammals of which 46 were isolated from monkeys in primate Colonies and Zoos and 5 from hooled animals.

Rathore *et al* (1982) conducted a countrywide survey on the prevalence of tuberculosis in wild life. Information was collected from 15 zoological parks, 2 National Parks and 8 sanctuaries in reserve forests of 5 states of India. A total of 56 cases of tuberculosis was recorded in wild mammals and birds. None of these cases were from free living wild animals. This disease was responsible for the death of 16 spotted deer, 10 Primates belonging to 6 species, 5 Tigers, 4 Bears, 1 Wolf, 5 Black buck, 6 Tragopan Pheasants, 1 Peacock, 1 Brahminy duck, 1 Demoiselle Crane and 1 Emu in different Zoological Parks.

In a survey conducted from July, 1984 to October, 1985, Wu (1986) of the Department of Veterinary Medicines, NAT Institute, Pingtung, Taiwan conducted tuberculin test on 129 deer of various species of 19 deer farms and 2 Zoological Parks. Using PPD (Bovine tuberculin) he found that 27 deer (20.9%) which include 21 Sambar (*Cervus unicolor*) 5 Fallow deer (23.8%) and 1 Sika deer (3.3%) were positive reactors. post-mortem examination on Sambars showed tubercle formation in different organs which were similar to histopathological changes in typical tuberculous lesion except the formation of Langerhan's giant cell. The organs affected were mainly lungs, upper trachea, larynx, lymphnodes, tonsils, colon, caeca,liver,pleura and skin.

MATERIALS AND METHODS

Reports of deaths of animals and birds from tuberculosis at Alipore Zoo over a period of 23 years i.e. from 1970 to 1992 have been collected, classified and given in the Table.

Application of different tests and techniques like examination of blood, sputum, skiagram, allergy test for the clinical diagnosis of tuberculous infection in wild captive animals are almost impossible. Even tuberculin tests on deer, antelope, monkeys etc. involves risk both for the operators and the animals.

Retarded growth, emaciation in certain cases and anorexia were the symptoms which arouse suspicious for TB infection. Confirmation was made by finding out the P.M. lesions and subsequent detection of organism by Ziehl-Neelson test.

During early part of 1960, deaths of some valuable animals in Alipore Zoo particularly, primates and deer aroused commotion amongst the city dwellers through the press. As it is related with the public health hazard, a committee was formed in August, 1960 under the Chairmanship of Dr. A.C. UKil, M.B. MSPE (Paris) FCCP (USA) FNI, FAS, FSMFB, a noted TB Specialist for fact finding and also to make recommodation for controlling the incidence of T.B. in Zoo animals. One of the recommendations of the committee was that "Watenever several cases of T.B. occur in an enclosure or an animal house, chemoprophylactic treatment with I.N.H. may be applied to all animals exhibited there". Accordingly isoniazid, an antituberculous drug was given to deer, antelope and primates at the rate of 4-5 mg/kg bodyweight daily once with the feed as a chemotherapeutic agent. In case of deer and antelope, medicine was administered in the form of powder mixed with concentrate feed. In case of primates, the powdered medicine was mixed with rose syrup and offered to the animals after spreading the same over the sliced bread. A gap of three months was given after three months of daily administration of the medicine and this procedure was continued throughout the year.

Due to non availability of the medicine at the open market administration of this chemotherapeutic drugs became irregular during the period from 1972 to 1975. Again due to

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controversy over the use of antitubercular drug as a prophylactic measure, administration of the said drug was kept suspended during the period from 1979 to 1982. Since 1961, the antituberculor drug "Delon" (M/S. Dey's Medical stores) was in use. This drug was discontinued after 1971 but resumed again from 1976 - 1978. From 1983 onward Isonex of (M/s. Pfizer Ltd.) was used. At present Isokin of (M/s. Park-Davis) is being used as an antitubercular drug.

OBSERVATION AND DISCUSSION

Prolong and continuous use of antituberculous drug to the hooted animals and primates did not show any serious adverse reaction. Only the animals belonging to the deer family were found to suffer from patchy alopecia occassionally. The incidence of alopecia was more prominent in spotted deer, brow-antlered deer and sambar It was never observed in barking deer. Whenever the incidence of severe alopecia was noticed in a herd, the administration of the drug was discontinued. Hairs started to grow after the withdrawal of the drug.

Use of antituberculous drug reduced their incidences of death from tuberculosis considerably(Table).

In the year 1990, a 8 months old Giraffe calf died suddenly after a short illness at the zoo. Clinical symptoms were anorexia, dyspnea and loss of body condition. On postmortem examination, it was found that the animal died of miliary tuberculosis affecting both the lungs ,kidneys, Liver and spleen. Incidentally it may be mentioned here that the said Giraffe calf including its parents were not treated with antituberoular drug before. It was suspected that this type of generalised tuberculosis in an young Giraffe calf might be due to transmission of the disease from the other apparently healthy stock which were kept together. Preventive treatment of the apparently healthy animals started forthwith by using a combined oral therapy (R-cinex and combunex).

The chances of rendering individual treatment to a captvie wild animal is remote as diagnosis and segregation of affected animals are very difficult. Preventive measures by using anti-tubercular drugs preferably the "Combined therapy" may reduce the incidences of T.B. Care must be taken to control the side effects which can be averted by discontinuing the medicine for a few months along with enrichment of food by adding sufficient quantity of vitamins and minerals.

CONCLUSION

In Zoos, sanctuaries, deer parks etc. where clinical detection, segregation and rendering individual treatment is not possible, specially to those animals which are in a herd, chemotherapeutic agents preferably in combination may be used to reduce the incidences of the disease in a particular population.

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Key to Annexure I on next page.

Primates include:- Rhesus (35), Common Langur (32), Bonnet (26), Hamadryas Baboon (14), Crabeating(10), Stumptailed (8), Anubis Baboon (6), Assamese (6), Japanese (5) Lontail (4), Nilgiri Langur (4), Pigtail Monkey(4), Gibbon (2), White handed Gibbon (2) Mandril(2), Capped langur (1), Chimpanzee (1) and sooty Mangabey(1).

Deer incluce:- Spotted Deer(32), Brow-antlered deer(19), Hog Deer (16), Swamp Deer (3), Mouse Deer (1), Barking Deer(1) and Fallow Deer(1).

Antelopes inculde:- Indian antelope(12), Eland(5), Nilgai(5), Chinkara(3), Four horned antelope (3) and Beisa Oryx(1).

Birds include:- Purple Moorhen(3), Malayan Fireback Pheasant(2), Cotton Teal(2), Pintail Duck(2), Mandanne Duck(1), Hill Partndge(1), Lesser Whistling Teal(1), Indian Tree Pie(1), Rosefaced Love Bird(1), Garganey Teal (1) Indian Peatowl(1), Palwan Peacock Pheasant(1) and Booted Bantam(1).

Others include:- Bengal Porcupine(5), Common Otter(4), Bennett's Wallaby(4), Barbari Wild Sheep(2), Gayal(20), Llama (2), Dama Wallaby(2), Prma Wallaby (1), Quokka (1), Kangaroo (1), Giraffe(1), Malayan Giant Squirrel(10) . Red panda(1), Sloth Bear(10), Malayan Sunbear(1), Camel(1) and Warthog(1).

(The figure mentioned against each species with in the parenthesis denotes the number of deaths due to T.B. during the period from 1970 to 1992 i.e .23 years.)

TABLE

Species wise list of animal that died of tuberculous at Allpore Zoo.

Year	Primates	Deer	Antelopes	Birds	Others	Total
1970	5	2	2	Nil	1	10
1971	2	5	Nil	Nil	Nil	7
1972	7	3	2	Nil	6	18
1973	3	2	1	Nil	3	9
1974	7	8	6	1	1	23
1975	12	2	1	2	3	20
1976	9	1	1	1	1	13
1977	3	1	2	Nil	1	7
1978	5	1	2	2	1	11
1979	18	Nil	Nil	1	2	21
1980	16	5	Nil	1	3	25
1981	8	12	Nil	4	1	25
1982	13	10	Nil	Nil	1	24
1983	5	2	1	5	1	14
1984	11	4	1	1	Nil	17
1985	7	3	Nil	1	Nil	11
1986	6	4	2	Nil	Nil	12
1987	8	1	5	1	1	16
1988	3	2	1	Nil	Nil	6
1989	10	2	Nil	Nil	Nil	12
1990	4	3	1	Nil	3	11
1991	3	Nil	1	1	1	6
1992	2	Nil	Nil	Nil	1	3
Total:	**167**	**73**	**29**	**21**	**31**	**321**

* Irregular use of antitubercular drugs.
** Withdrawal of administration of anti-tuercular drugs
*** Regular and uninterrupted use of antitubercular drugs