PARASITIC DISEASES IN INDIAN ELEPHANTS - REVIEW *Elephas maximus indicus*

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INTRODUCTION

Elephant is the largest of all living land mammals with an evolutionary background of more than 60 million years and has often been mentioned in the ancient Indian literature. For religious purposes, timber logging operation and forestry activities the elephants are still indispensable. In India the elephants are mostly seen along the foot of the Himalayas, tract of forest between Ganges and Krishna river and also in Western Ghats and in the hill forests of Karnataka, Kerala and Assam. So far, no census can say the exact number of elephants available in the country. Approximately about 7,000 elephants are found in India, of which approximately 43 per cent are seen in South India (Singh, 1994).

The elephants are invariably affected by many of parasitic diseases as like in other domestic animals. Reports of parasitic disease of elephants are very meagre. However, a few known parasitic diseases along with their treatment are reviewed in this manuscript.

I. TREMATODES

The occurrence of *Schistosome* in elephant liver was first reported by Mudaliar and Ramanujachari (1945) and they named it as *Schistosoma nairi.* The other flukes affecting the health of elephants are *Amphistomes* such as *Gastrodiscus secundus, Pseudodiscus collinsi, Pfendarius papillatus, Pfendarius birmanicus* and *Pseudodiscus hawkesii* (Bhalerao, 1935; Bapu; 1936; Huang, 1981; Dutta and Bordoloi, 1989).

The liver fluke is *Fasciola jacksoni* (Bapu, 1936; Huang' 1981; Chakraborthy and Chaudhry, 1992; Borthakur *et al.*, 1993) and blood flukes are *Bivitellobilharzia nairi* (Sundaram *et al.*, 1972; Islam, 1994), *Ornithobilharzia nairi* (Rao and Hiregauder, 1953).

Among these, liver and blood flukes were the most pathogenic ones. They cause severe anaemia and cirrhosis of liver. The affected animal eats plenty of soil (about 10-20 kg) when let loose for grazing. The animal becomes dull, anorectic and the ears were cold to touch. The dung bolus is brown in colour and coated with mud. Foul smelling watery diarrohea is noticed 12-24 hours after eating the mud. (Bapu, 1936).

Rao and Hiregauder (1953) reported, the animals affected with blood fluke infection showed weakness, anorexia, difficulty in urination and tendency for vomiting. The mucous membrane was pale and diarrhoea followed by constipation.

In addition to the above symptoms Borthakur *et al.* (1993) observed symptoms of tympanitis, coiled trunk, extension of limb, dropped ear, conjunctivities, frothy salivation and frequent urination. But temperature was abnormal, respiration shallow and pulse rapid.

The liver fluke is sometimes found attached to the biliary epithelium and they are distorted by necrotic tissue which contain RBC's and ova of *Fasciola jacksoni* (Chakraborthy and Chaudhry, 1992).

Kalapsesi and Purohit (1957) found the *schistosome* eggs in liver and mesentric lymphnode. They could not identify eggs in faeces. But in histopathological section they revealed an adult worm with non tuberculate cuticle in mesentric vein.

The diarrohea is found in all trematode infection and lasts for 3 days and sometimes may extend for a week. Odematous swelling is noticed on the intermandibular region or on lower abdomen especially in rumen fluke infection (Chandrasekaran *et al.*, 1982). Singh *et al.* (1994) studied the pathology of *Fasciola jacksoni* in liver and found haemorrhagic tracts, thickening of bile ductules, cirrhotic changes and pseudolobulation. In lungs, the bronchial lumen contained desquamated cell mixed with fibrohaemorrhagic exudate.

Chandrasekaran *et al.*, (1982) suggested that the Hexachlorophene (Distodin) 8-10 mg/kg B.W. was 100 percent effective against Amphistomes. Drugs such as Nitroxynil (Trodax) 10 mg/kg/ SC and Rafoxanide (Ranide) - 2.5-5 mg/kg/ can also be tried.

Borthakur *et al.*, (1993) opined that an oral dose of 100g, Avlothane (ICI) in two divided dose has seen recovery from this infection with in a month.

Antimosan 200 ml/ animal, S/c, single injection for 3 weeks at weekly interval helped to treat the *Ornithobilharzia* infection was suggested by Rao and Hiregauder (1953).

II. CESTODES

The occurrence of cestode *Anoplocephala manubriata* was observed by Chandrasekharan *et al.* (1979) in Kerala. They revealed that affected animal became anorectic, deteriorates in condition, eats grit and mud apart from suffering from diarrhoea.

Oxyclozanide (Zanil ICI) @ 3.4 mg/kg B.W. orally was found to be effective against proglottids (Chandrasekharan *et al.*, 1979).

Other drugs that can be tried include (Paniker, 1992).

1. Niclosamide (Niclosan) @ 75 - 100 mg / kg B.W. Orally,
2. Haxachlorophene (Distodin) @ 10 mg / kg B.W. Orally,
3. Mansonil - 5 mg/Kg, Orally,
4. Praziquentel (Droncit) - 2.5 - 4 mg/kg, orally.

III NEMATODES

The species of nematode recorded from Indian elephants were *Amira pileata, Decruzia aditicta, Equinurbia siphunculiformis, Quilonia travencra, Q. rennie, Murshidia murshidia, M. falcifera, M. indica* (Sundaram *et al.*, 1971) and *Chomiangium epistomum* (Datta *et al.*, 1972). *Bathmostomum sangeri*

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(Sathianesan *et al.*, 1979; Adkoli *et al.*, 1986; Dutta and Bordoloi, 1989) *Parabronema indicum, P. smithi* (Panicker, 1992). The stomach worm *Haemonchous contortus* was first recorded by Rahman *et al.* (1970) on postmortem examination in an elephant of Mysore area.

The hook worm was first recorded by Bhalerao (1935) in India from bile duct of an elephant and he named them as *Grammocephalus elathratus* and *G. varedatus* a new species of strongyle was also recorded by Mudaliar and Alwar (1954). Rajasekhariah *et al.* (1975) recovered both immature and adult worms of *G. hybridatus* from a nodule in the stomach and they reported it was a unusual site for this parasite. Subsequently Pillay *et al.* (1976) also reported *G. hybridatus* from the liver of an elephant.

Affected animals showed symptoms of drowsiness, inappettence and shivering. Rajamohanan (1970) observed acute enteritis in elephants with most of the nematode infection. During postmortem examination the following changes were noticed, such as liver was pale, enlarged and packed with nematodes. There was mild proliferation of connective tissue in portal tract, besides marked hyperplasia, hepatic and kuffer cell loaded with bile pigments, sinusoids showed slight to moderate engorgement and in focal areas revealed polymorphs and macrophages. (Pillay *et al.*, 1976).

Monning (1932) recorded the *Syngamus indicus* a new nematode from the lower portion of pharynx of an Indian elephant. Greve (1969) found Indian elephants infected with *Strongyloides elephantis* to be anaemic, depressed and in poor general condition. On postmortem examination, these animals had suppurative bronchopneumonia, enlarged mesentric lymphnode and emaciation. Datta *et al.*, (1972) reported animals irrespective of age, sex, body weight in *Chomiangium epistomum* infection showed emaciation, anaemia, exhausted even during light work, and coprophagia. Dung found to be loose, noxious smell, flatulence and sub normal temperature was observed.

Lakhar and Das (1988) reported the presence of Trichostrongyle infection in 6 elephants of both sexes from Khanapara, Assam. The animals showed symptoms of anorexia, diarrhoea and soil eating habit. Other ascarid, strongyle, *Strongyloides* species worms were also recovered from Indian elephants by Dutta and Bordoloi (1989).

Treatment for Gastro intestinal nematodes

The following drugs were tried by different research workers,

1. Tetramisole hydrochloride (Nilverm) 3-5 mg/kg B.w s/c (Sundaram et al., 1971; Datta *et al.*, (1972)

2. Thiabendazole (Panacur) - 40 mg/kg B.W. orally. (Chandrasekharan *et al.*, 1972)

3. Morantal tartrate (Banminth II) 2-5 mg/kg B.W. orally (Chandrasekharan *et al.*, 1973)

4. Thiophanate (NEMAFAX) - 14 mg/kg B.W. orally, against Strongylosis. (Chandrasekharan *et al.*, 1979)

5. Methyridine (Promintic) @ 50 mg/kg/ B.W. S/c, diluted with equal quantity of water effective against *G. varedatus* and *M. falcifera*. (Chandrasekharan *et al.*, 1979)

6. Oxybendazole (SKF) - 2.5 mg/kg orally against strongyle infection (Sathianesan *et al.*, 1979)

7. Mebendazole 3-4 mg/kg B.W

8. Levamisole 3 mg/kg B.W

9. Bephenium hydroxynapthoate - 25 mg /kg B.W

10. Diosophenol - 3 mg/kg. All these drugs (7 - 10) were tried against GI nematodes. (Chandrasekharan *et al.*, 1982).

11. Fenbendazole 25 % (Panacur Hoechst) 5 mg/kg. (Roy and Majumdar, 1988). Single dose, orally found effective against *Murshidia murshidia* infection.

12. Fenbebdazole (Panacur) - 24 to 30 g/animal orally was useful for treating nematode infection. (Rao *et al.*, 1990).

Cutaneous filariasis

Elephants also suffer from haemorrhagic filariasis or parasitic dermatorrhagia caused by *Indofilaria pattabiramani* and *I. elephantis* (Alwar *et al.*, 1959; and Chandrasekharan *et al.*, 1972) respectively. This parasite can affect all animals irrespective of age, sex and body weight.

A nodule appears on the skin at the sides underneath the abdomen and less frequently on the neck, chest, and outer aspect of thigh. Nodules are one cm thick, 1-2 cm in diameter. The nodules appear at a rate of 4-10 per day and up to 270 nodules has been reported during a period of 6 weeks. About 5-10 ml of blood passes out from each nodule during hotter times of the day. The oozing blood contained large number of microfilaria. The disease is seen through out the year and mostly during months of October and April. (Alwar *et al.*, 1959)

Treatment

1. Arsenical preparation (Acetylarsan) 30-40ml, S/C five inj. should be given on alternate days. If treatment is further needed, should be continued after a week.

2. Anthiomaline - 50 ml / 2000 kg, s/c, 6-10 Inj (KAU, 1987)

3. By control of flies with Insecticides, fly repellents and frequent application of neem oil around the haemorrhagic nodule helped to prevent the biting of flies. (KAU, 1987).

Stephanofilarial dermatitis

Stephanofilaria srivastavai was recorded for the first time in an Indian elephant by Bhattacharjee (1967). Subsequently, it had been also recorded by chatterjee *et al.* (1982) and Tripathy *et al.* (1989) in a female elephant. Affected animal had sores of 1 X 1/2 " in size, located on the left side of the back slightly ahead of shoulder blade, just in front of the saddle. The lesion was covered with crust and pus. They also recorded several female worms from the deep scrapings of the sore. The chronic dermatitic skin lesion was also observed by Chatterjee (1984) and Tripathy *et al.* (1989) in region of toes, heels of hind feet and right abdominal wall.

The line of treatment is similar to that of hemorrhagic dermatitis. The other drugs that can be tried was metrifonate 8% (Trichlorfon) in himaxbase will cure in 15 days, vaseline base will give cure after 22 days. (Tripathy et al., 1989).

IV ECTOPARASITES

The ectoparasites recorded from elephants were *Haematomyzus elephantis* (Raghavan *et al.*, 1968; Chandrasekharan *et al.*, 1972), *Cobboldia elephantis* (Datta *et al.*, 1972), *Tabanus sp.* and *Haematopoda sp.*, (Sundaram, 1966).

The bots are the larvae of *Cobboldia elephantis* flies, found more during rainy days, lay their eggs on hairs in various part of body and at the root of tusks in males. Animals irrespective of age, sex and body weight become highly emaciated, anaemic and gets exhausted even at light work. Body temperature is subnormal. (Datta *et al.*, 1972).

Haematomyzus elephantis was found mostly in the ear where the skin is thin, soft and easily penetrable, causing severe dermatitis, pruritis and dryness. There was scale formation on the neck, ears, abdomen and tail. (Raghavan *et al.*, 1968)

Treatment

1. Thorough dusting with Gammaxane (0.5%) all over the body.

2. Washing with sumathion 1% as a 1 in 100 solution

3. Raghavan et al. (1968) Suggested that application of sulphur in oil 10 per cent solution all over the body was effective in treating the louse infestation.

4. Nilverm (ICI) - 3 mg/kg B.W. single dose orally mixed with crushed grams. The animal recovered with in a period of 7 days in *C. elephantis* infection (Datta *et al.*, 1972).

Ticks

The ticks that had been recorded from wild elephants in Kerala were *Boophilus annulatus*, *Haemophysalis spinigera*, *Rhiphicephallus haemophysaloides*, *Ornithodorous savignyi* (Panicker, 1992).

V PROTOZOAN DISEASES

Babesiosis

The incidence of babesiosis in elephant is rare. The occurrence of piroplasmosis had only been described in elephants belonging to the Bareilly area in U.P. (Lingard and Jennings, 1904). Affected animals showed symptoms of anorexia, constipation, dark coloured urine, high temperature, iecteric mucous membrane of conjunctiva, dullness and weakness. (Mcgaughey, 1961).

Babesan or Berenil may be tried as a treatment

Surra

In elephants surra is caused by *Trypanosoma evansi* (Mcgaughey, 1961), transmitted by species of *Tabanus* and *Stomoxys* flies. The disease is most prevalent during rainy season when the fly population is more.

Affected animals appears dull, restless, sleepy, quite disinclined to move, eyes protruding, frothy discharge from eyes and nostrils, mucous membrane were pale, odematous swelling on the dependent part, throat, abdomen and along the sheath. Skin is dry, harsh, urine scanty, turbid and often greenish in colour. Mucous membranes of proboscis and eyelids loose their pink colour and become dirty white. There is intermittent rise of temperature and lacrimation (Panicker, 1992).

Treatment

1. Berenil - 5 to 8 mg/kg, I/M. (Panicker, 1992)

2. Antricide methyl sulphate - 24 ml of 10% solution/animal, S/C. (KAU, 1987).

3. Neganol - one ounce dissolved in 5 ounce of water, I/V.

4. Tryparsamide - Initial dose 20 gm in 20 ml water I/V, gradually increased to 40-50 gms at weekly interval until a total dose of 500 gm is reached.

5. Antricide prosalt - 7gm in 30 ml dis water S/C.

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