Observations on the Occurrence, Etiology and Treatment of Diarrheas in Captive Gibbons

Principal Investigator: Markpol Tingpalapong, DVM

Associate Investigators: David E. Davidson, LTC, VC
Elisandro Rodriguez, SSG
Kitti Watanasirmkit, B.Sc.
Pravate Lertprasert
Wichiyan Paniom
Ruan Promano

OBJECTIVE: To determine the causes of diarrheas in captive gibbons and to evaluate methods of treatment.

DESCRIPTION: The information included in this report was collected over a one year period in a colony of 55 gibbons (*Hylobates lar, Hylobates lar pileatus,* and *Hylobates concolor*) maintained at the SEATO Medical Research Laboratory. Forty-one of these gibbons were maintained in individual cages within a screened laboratory building. Fourteen were kept outdoors in 9 large breeding cages singly or in pairs. The gibbons were fed commercial primate chow daily, and banana, acacia, and oranges were fed 3 times per week. Chlorinated drinking water was provided *ad libitum.* All cages were cleaned daily and steamed weekly.

Fecal specimens were collected monthly from each gibbon for parasitological and bacteriological examination. In addition, fecal specimens were collected from gibbons with diarrhea on the first day of illness, and following treatment. Symptomatic treatment was initiated on the first day of diarrhea, and the therapy was modified in accordance with the etiology after the results of the fecal examination were known.

PROGRESS: Sixty-five cases of diarrhea were observed in forty-eight of the gibbons during the period of observation. Thirteen animals had episodes of diarrhea more than once. The 65 cases are classified by etiologic category and month of occurrence in Table 1. Protozoans were observed 28 times, accounting for 43.1 percent of the cases, while helminthiasis was observed 27 times, or in 41 percent of the cases. Diarrhea caused by a bacterial organism (*Shigella flexneri*) was observed in only one case. Under the "unknown" category are those cases in which no sample was obtained (4 cases) or in which no causative organism could be identified (5 cases). Multiple infection with both a protozoan and a helminth was noted in 3 cases occurring in August and in January. The highest incidence of diarrhea was noted in the early part of the hot dry season in February and March.

A further classification of the etiologic agents associated with diarrhea in the gibbon is presented in Table 2. *Strongyloides sp.* was the most frequently identified organism, accounting for 29.2 percent of the cases. *Balantidium coli* was the second most common organism isolated, and *Entamoeba coli* third.

The treatments used in the management of diarrhea in the gibbon and their effectiveness are summarized in Table 3. Treatment failures are defined as failure to completely eliminate parasites as determined by a fecal specimen taken at the end of the course of treatment. In these cases the therapeutic regimen was repeated. Reoccurrence is defined as reappearance of parasites at some time during the year following apparently successful treatment. Reoccurrence may be the result of re-infection or of recrudescence of sub-patent parasitism.

SUMMARY: The frequent occurrence of diarrheas is a problem in the management of gibbons in captivity. Helminths and protozoan parasites are the principle etiologic agents, with *Strongyloides sp., Balantidium coli,*

and *Entamoeba coli* accounting for the majority of cases. These diarrheas can be treated successfully in most cases with appropriate regimens of therapeutic drugs, but recrudescence and reinfection are a significant problem requiring regular screening of fecal specimens.

Table 1.

Cases of Diarrhea in Captive Gibbons by Etiology and Month of Occurrence

	Number of Cases of Diarrhea												
Etiology	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Total
Helminthic	6	1	3	2	4	—	1	2	2	2	2	2	27
Protozoal	5	2	2	1	2	2	—	1	1	2	5	5	28
Bacterial	—	—	—	—	—	—	—	—	—	—	—	1	1
Unknown	1	1	2	1	1	—	—	—	—	—	1	2	9
Total	12	4	7	4	7	2	1	3	3	4	8	10	65

Table 2.

Etiologic Agents Associated with Diarrhea in the Gibbon

Etiologic Agent	Number of Cases	Percent of the Total
HELMINTHIC	27	41.5
Strongyloides sp.	19	29.2
Ancylostoma sp.	5	7.7
Trichuris sp.	3	4.6
PROTOZOAL	28	43.1
Balantidium coli	14	21.6
Entamoeba coli	8	12.3
Giardia lamblia	3	4.6
Entamoeba histolytica	2	3.1
Chilomastix mesnili	1	1.5
BACTERIAL	1	1.5
Shigella flexneri	1	1.5
UNKNOWN	9	13.9
TOTAL	65	100.0

Table 3.

Therapeutic Management of Diarrhea in the Gibbon

Etiologic Agent	Therapeutic Agent	Treatment Regimen	Treatment Failures Requiring Re—Treatment	Reoccurrence
Strongyloides sp. *Trichuris sp.*	Thiabendazole (Mintezole^{R})	10 mg/lb. b.i.d. orally for one day	1 of 22 cases	Strongyloidiasis 3 of 19 cases recurred in 3—6 month. Trichuriasis 1 of 3 cases recurred in 8 months
Balantidium coli *Entamoeba coli*	Carbarsone plus Tetracycline	125 mg for 10 days orally b.i.d. 50 mg. for 10 days orally b.i.d.	1 of 18 cases	*Entamoeba coli* 4 of 8 cases recurred within the year
Entamoeba histolitica *Chilomastix mesnili* *Giardi lamblia*	Metronidazole (Flagyl^{R})	150 mg. orally b.i.d. for 10 days	3 of 10 cases	*Balantidium coli.* 5 of 14 cases recurred within the year.
Ancylostoma sp.	*Ancylol*^{R}	0.1 ml/lb. subcutaneously repeated in 14 days	0 of 5 cases	None