

A year's experience of giardiasis on Hong Kong Island

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Cases of giardiasis diagnosed by stool microscopy performed in a single laboratory serving two general practices on Hong Kong Island were reviewed by retrospective analysis of case notes. From 1 September 1992 to 31 August 1993, 95 stool samples from 88 patients were found positive for *Giardia* spp. Case notes were available for analysis of 77 subjects. There were 50 children (mean age 39 months) and 27 adults (mean age 36 years) in a predominantly Caucasian population. Infection was most common in the spring months of February and March and widespread over Hong Kong Island. Diarrhoea (47%) and abdominal pain (27%) were the commonest symptoms. Twenty (23%) of the stool samples positive for *Giardia* spp. were obtained from asymptomatic members of 12 families with a symptomatic case. Treating all family members on the basis of a positive stool result for *Giardia* spp. from one member would seem justified in view of frequent person-to-person transmission and the poor diagnostic sensitivity of stool microscopy.

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Introduction

Giardiasis is generally considered to be uncommon in Hong Kong, however, there is no published or available public health data to confirm this impression. There has been no reference to giardiasis in Hong Kong in the medical literature in the past 10 years. Not being a notifiable disease, the Department of Health's Statistical Unit keeps no data on *Giardia* spp. infection. Enquiries at two major hospital-based microbiology services in Hong Kong confirm that *Giardia* spp. are not commonly seen in stools collected from the hospital and outpatient populations served. The Prince of Wales (New Territories) and Queen Mary (Hong Kong Island) Hospitals together diagnose fewer than 40 cases annually. However, results from our laboratory which serves two practices on the south side of Hong Kong Island, suggest that giardiasis is a common infection in the community. We have therefore performed a retrospective study of the 95 episodes in

88 patients which yielded a diagnosis of giardiasis on stool microscopy.

Giardiasis is a common pathogenic protozoal infection of the gastrointestinal tract and occurs worldwide. Clinically, the patient may present with an acute illness characterised by nausea, anorexia, malaise, diarrhoea and abdominal pain.¹ The patient may develop a chronic disease, resulting in failure to thrive, chronic diarrhoea and malabsorption in children, or persistent abdominal pain and loss of appetite and weight in adults.¹ An asymptomatic carrier status is well recognised.^{1,2} The organism is transmitted by the faeco-oral route, most often via contaminated water supplies, contaminated food, person-to-person contact, domestic pets, and sexual transmission.^{3,4}

The *Giardia* group are the main pathogens in man, who is also their principal host and reservoir. Diagnosis is usually based on repeated stool examinations for trophozoites or cysts, although the false negative rate is rather high, being approximately 30%.¹ Other methods of diagnosis include microscopic examination of duodenal aspirate, with culture and brush cytology. Tests for specific IgM and IgG antibodies have been described in other countries, but are currently unavailable in Hong Kong.^{1,5-7} *Giardia* spp. antigen detection

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in stool samples has been described, but has a low sensitivity.⁸

Subjects and methods

Eighty-eight subjects with 100 positive stool microscopies between 1 September 1992 and 31 August 1993 were examined. All subjects attended the two practices in Repulse Bay and Chung Hom Kok and lived mainly on the south side of Hong Kong Island. The practices together serve a population of approximately 5000 patients. Over this period, there were an estimated 14 000 consultations, comprising Caucasians (88%), Chinese (9.7%) and other races. The laboratory received 958 stool samples for analysis, 40 from Chinese patients (4.2%), with the remainder mainly from Caucasian patients. The 88 subjects investigated were Caucasian (85), Chinese (2) and Filipino (1) by race. Case notes of 77 subjects were analysed retrospectively for age, place of residence, date(s) of stool microscopy positive for *Giardia* spp., presence of other household members with positive stool microscopies, and presenting symptoms and treatment. The remaining 11 case notes were unavailable as the patients had left the practice. However, data on race, date of specimen collection, place of residence and family/household relationships were available for these 11 subjects. There were 50 children (mean age 39 months; age

range eight months to 10 years) and 27 adults (mean age 36 years; age range 23 to 49 years).

Fresh stool smears were prepared with normal saline, examined microscopically using a low power objective (x 10 magnification) and the presence of *Giardia* spp. cysts (size 10 to 15 μ m) confirmed using a high power objective (x 100 magnification). Trophozoites were not seen. Six-monthly independent review of stool microscopy diagnoses was undertaken by another laboratory and confirmed the reliability of stool microscopy diagnosis. Positive stool microscopies were considered as new infections if they were detected more than four weeks after the first positive report and after an interim stool microscopy free of *Giardia* spp. Five positive samples collected within two weeks of the first positive sample were considered to be from the same episode and excluded from the analysis. A total of 95 positive stool results were therefore analysed. One patient had a history of overseas travel. A pregnant patient with two positive stool microscopies elected not to be treated because of potential treatment side effects.

Results

There were 16 families with more than one member infected with *Giardia* spp. They accounted for 40 of

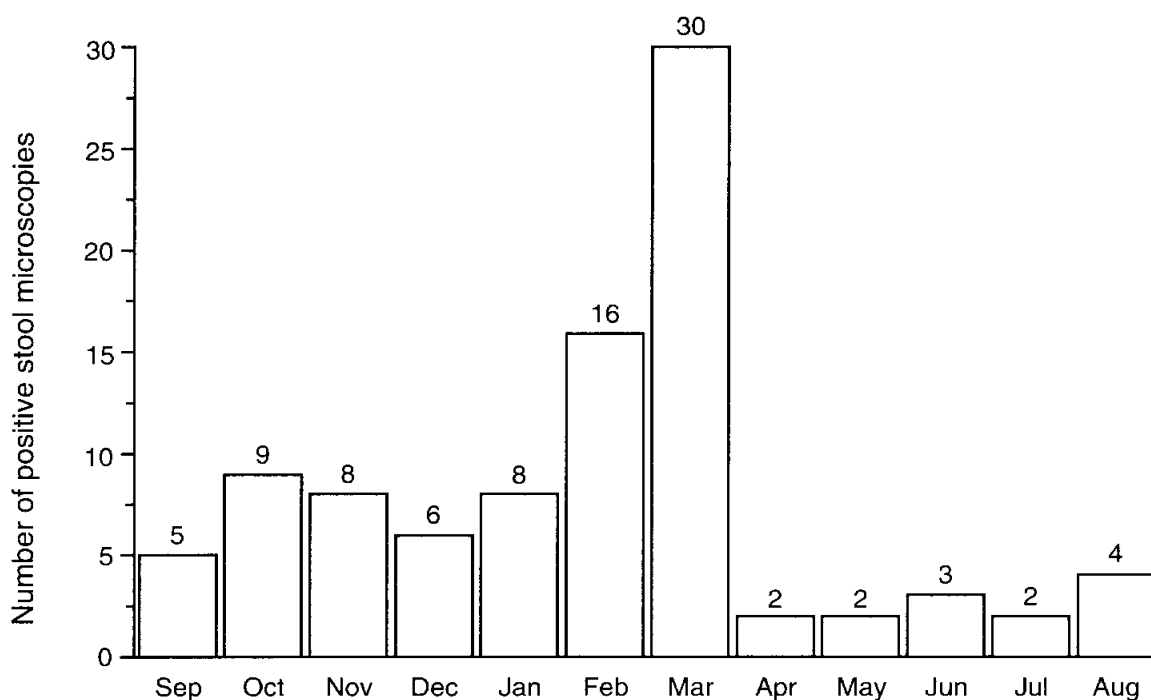


Fig 1. Seasonal distribution of positive stool microscopy for *Giardia* spp. infection from 1 September 1992 to 31 August 1993

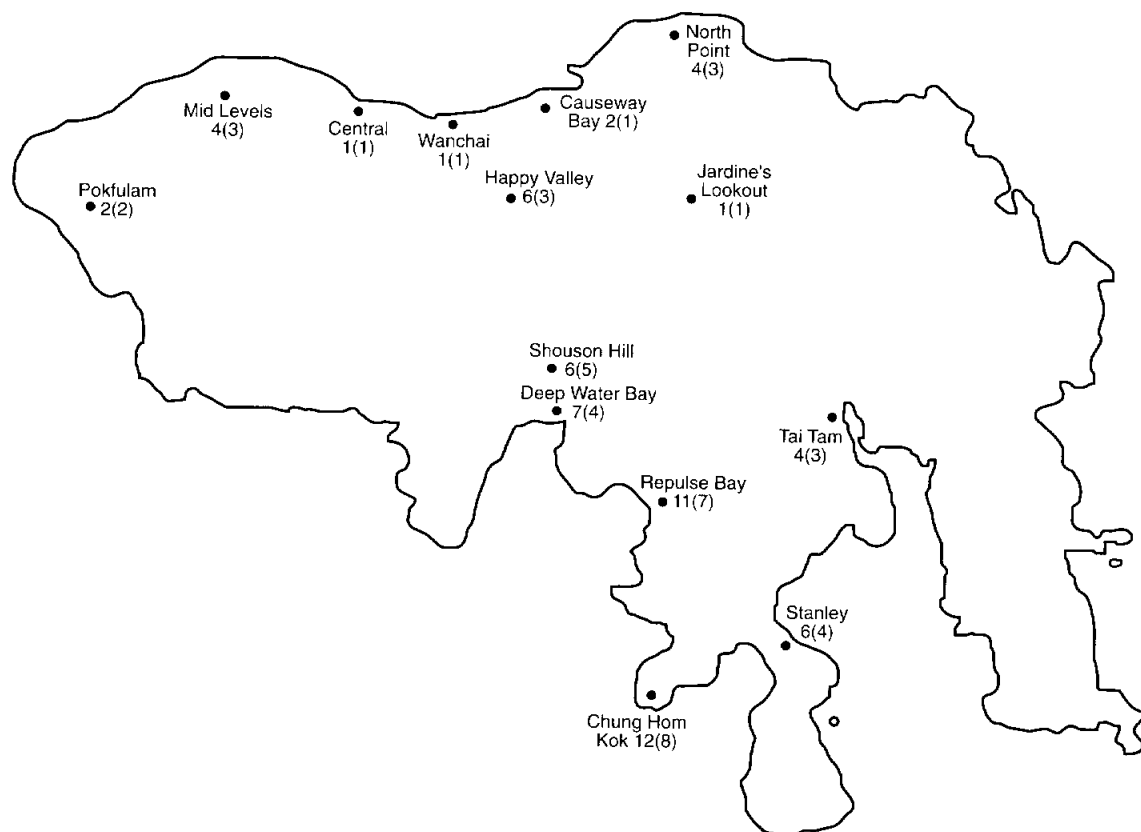


Fig 2. Map of Hong Kong Island showing geographical distribution of subjects with *Giardia* spp. infection. Figures represent the number of patients and those in brackets represent the number of families.

the total 88 (45%) patients and 45 of the 95 (47%) positive microscopies. Seven patients (8%) had at least one repeat positive stool microscopy (maximum two repeats) within the one year period and three patients (3%) had a previous history of giardiasis.

The monthly distribution of *Giardia* spp. infection is given in Fig 1. Forty-six of 95 (48%) stools positive for the organism occurred in February and March. The geographical distribution of 77 patients is given in Table 1 and shown graphically in Fig 2. This shows that patients with positive stool microscopies were widely distributed on Hong Kong Island. Information on the symptoms of 70 of the 88 patients is shown in Table 2. A broad spectrum of symptoms were reported, with diarrhoea and abdominal pain being the principal complaints in both children and adults. In 12 families, apart from the symptomatic cases, there were 20 other asymptomatic members who had stool microscopies positive for *Giardia* spp.

The various treatments given to the patients are shown in Table 3. Data was available regarding treatment of 73 of the 95 episodes in 66 of the 77 patients.

Of the five patients who had repeatedly positive stool microscopies ascribed to treatment failure, four were children treated with metronidazole for at least three days and the other was an adult given tinidazole for three days. In all, 12 patients had more than one course of treatment based on repeatedly positive stool microscopies. Four were treated with both metronidazole and tinidazole on separate occasions.

Discussion

Diagnosis of giardiasis by stool microscopy is time-consuming, relatively expensive, insensitive, and frustrating for both the doctor, patient and laboratory technician. More than one stool sample may be required to make the diagnosis as the false negative rate per examination is approximately 30%.¹ This may be due to variable shedding of *Giardia* spp. cysts and trophozoites.⁹ Stool collection is unpopular with patients in private practice and is potentially expensive (stool microscopy currently costs HK\$90; culture and sensitivity HK\$270). It is labour intensive, requiring a long time to search for cysts. Duodenal sampling, while increasing diagnostic sensitivity, is not feasible in a

Table 1. Geographical distribution of patients with *Giardia* spp. infection

Place	Number of patients	Number of families
Chung Hom Kok	12	8
Repulse Bay	11	7
Braemar Hill	8	4
Deep Water Bay	7	4
Shouson Hill	6	5
Stanley	6	4
Happy Valley	6	3
Mid Levels	4	3
North Point	4	3
Tai Tam	4	3
Pokfulam	2	2
Causeway Bay	2	1
Central	1	1
Jardine's Lookout	1	1
Wanchai	1	1
Unknown	2	
	—	—
Total	77	50

primary care setting and the yields are also variable.¹ Serological testing for IgM response has a high sensitivity and specificity for acute giardiasis, but is currently unavailable in Hong Kong.⁵⁻⁷

A cluster of cases occurred during the spring months

of February and March 1993. This is in contrast to the United States, where late summer is the common time for increases in giardiasis.¹⁰ It will be interesting to see if this pattern is repeated in 1994. The cause of this clustering is unclear. It would be worthwhile to look for *Giardia* spp. in Hong Kong water or food supplies, but this would be a difficult undertaking and more appropriate for public health agencies to conduct. Many Caucasian families leave Hong Kong on holiday during the summer months of July and August, and this is reflected in a reduction in consultation rates by nearly 50% during this time. The incidence of infection in these two months may be underestimated, but this does not affect the significance of the observed spring cluster.

The mean age of our children was below school age. This is compatible with Bartlett's report from the United States that kindergartens and playgroups are an important source of transmission.¹¹ However, the authors could not demonstrate that aggressive identification, treatment and exclusion of affected children from day care centres resulted in better control of the infection in this setting.

Clinical symptoms reported by patients or their caregivers were highly variable. None of our children presented with failure to thrive. One child had a diagnosis of lactose intolerance (positive stool reducing sugars) made by another practitioner before a diagnosis of giardiasis was made. One child was concomitantly found to have an iron-deficiency anaemia. Both are recognised complications of giardiasis and should alert the clinician to the possibility of this underlying diagnosis. Interestingly, eight patients (seven children and one adult) presented without any gastrointestinal disturbance. The complaints were of loss of appetite

Table 2. Symptoms of patients with *Giardia* spp. infection

	Children (%) n = 46	Adults (%) n = 24	Combined (%) n = 70
Diarrhoea	21 (46)	12 (50)	33 (47)
Abdominal pain	10 (22)	9 (38)	19 (27)
Family contact as main presentation	13 (28)	7 (29)	20 (29)
Fever	12 (26)	4 (17)	16 (23)
Offensive stool	9 (20)	4 (17)	13 (19)
Vomiting	7 (15)	3 (13)	10 (14)
Normal stool	5 (11)	2 (8)	7 (9)
No gastrointestinal symptoms	8 (17)	1 (4)	9 (13)

Table 3. Treatment of patients with *Giardia* spp. infection

	Adults (mean duration, days)	Children (mean duration, days)
Metronidazole	7 (4.0)	42 (3.7)
Tinidazole	14 (3.5)	4 (4.0)
Not stated	6	5
	—	—
Total	27	51

12 patients received more than one course of treatment; four received both drugs

(4), fever (3), being "generally unwell", lethargic, irritable or "naughty" (6). The symptoms reported here are those documented as presenting complaints by the responsible practitioner and show a wide variety of patient presentations. A prospectively applied questionnaire would more accurately detect each symptom frequency.

Twenty patients who did not consider themselves unwell enough to present to their doctor were identified by family screening. Routine screening of all family members was not undertaken because of the cost involved. Treatment of the entire household on the basis of one affected member would appear to be justified since person-to-person transmission is a common mode of acquisition of giardiasis. Researchers in Spain found a carriage rate of 15% in family members under 15 years of age, and 4% in members older than 15.¹² A prospective study in Hong Kong would be useful.

Tinidazole was the preferred treatment for adults and those children who could swallow tablets, because of reported resistance to metronidazole in several series.^{13,14} Tinidazole suspension is not available in Hong Kong and so metronidazole is the first line drug in children.

The geographical distribution of cases in our study suggests that giardiasis is widespread in Hong Kong Island. The great predominance of Caucasian cases reported here reflects the patient population of the practices. That giardiasis may be acquired overseas by a more mobile Caucasian population is not confirmed by the histories obtained—only one patient had a recent history of overseas travel—and the spring clustering does not coincide with peak times of travel (July and August). Giardiasis is not well described in the Chinese population of Hong Kong. As variation in ethnic susceptibility to the organism is not documented,

it is likely that infection also occurs in the local Chinese population. An epidemiological study of Chinese patients utilising both stool analysis and serology may clarify this point.

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