

INTESTINAL ABSORPTION STUDIES IN *FASCIOLOPSIS BUSKI* INFECTION

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INTRODUCTION

Fasciolopsis buski can cause severe clinical symptoms including diarrhoea, abdominal pain, generalized oedema and passage of undigested food, and extreme prostration. The syndrome was first reported in Thailand by Daengsvang and Mangalasmaya (1941a, 1941b) and then Viranuvatti *et al.*, (1953). Death when it occurs is due to profound intoxication and heavy worm loads (Sadun, 1953; Saengpun, 1954). Since *F. buski* produces malabsorption symptoms, this study was conducted to detect any disorder in intestinal absorption in infected persons.

MATERIALS AND METHODS

Ten patients (6 males and 4 females) from Sena district, Ayudhaya Province, Thailand, where surveys showed prevalent rates as high as 20% *F. buski*, were selected (Jaroovesma *et al.*, 1980). Daily Stoll's egg counts for *F. buski* eggs prior to treatment, and formalin-ether technique after treatment with tetrachlorethylene (4ml) were determined in each patient. Hematocrit, red blood cell, white blood cell and differential counts, fasting blood sugar, serum albumin, globulin, blood urea nitrogen, creatinine and cholesterol were done according to conventional methods.

Carbohydrate absorption studies were determined by D-xylose tolerance test. On an empty bladder, each subject was asked to drink 250 ml of water containing 5 grams D-xylose in solution. All urine was collected for 5 hours, thereafter 250 ml of water was

also given after 2 hours to ensure adequate urine output. The 5 hours urine collection, was assayed for pentose by the method of Row and Rice (1948).

Protein absorption study was performed using radioisotopes and the protein lost determined in the feces (Henry, 1968; William, 1971). Sudan III was used for qualitative determination of fat in the feces.

Red cell and serum folate levels were determined by *Lactobacillus casei* as described by Hoffbrand *et al.*, (1966) and Water and Mollin (1961), respectively. Serum vitamin B₁₂ level and vitamin B₁₂ absorption were estimated by the methods of Lau *et al.*, (1965) and the modified Schilling method as described by Lajtha (1961), respectively.

Jejunal biopsies were performed with a Crosby capsule. The tissues were fixed in 10% formalin, sectioned and stained with iron hematoxylin-eosin for histological study.

RESULTS

Results of Stoll's egg count and number of worms recovered in the feces after treatment from 10 patients are shown in Table 1. The egg counts varied from 1,560 to 7,810 per day and the number of worms ranged from 0 to 31.

Results of hematological studies are shown in Table 2. Mild to moderate anemia (Hct 31-37% and Hct 29-30% respectively) were noted in 5 patients. White blood cell counts were within the normal limits but eosinophil counts were high and neutrophil was relatively

lower than normal in all patients. Five out of 9 patients had more than 20% of eosinophils in the peripheral blood and one patient had 56%.

Table 1

Stoll's egg count before treatment and number of worms found after treatment with tetrachlorethylene, from 10 patients.

Pt No.	Age (years)	Sex	Stoll's egg count/day	No. of <i>F. buski</i> * after Rx
1.	11	♂	3,800	3
2.	46	♀	2,800	0
3.	51	♀	4,160	2
4.	37	♂	3,150	3
5.	48	♂	1,560	1
6.	13	♂	7,810	31
7.	17	♀	5,600	0
8.	20	♂	4,550	0
9.	18	♂	2,200	1
10.	50	♀	2,100	1

*Stool examination for ova by the formalin-ether technique was negative for all cases after treatment.

Biochemical determinations are shown in Table 3 and results indicate no difference from the normal except insignificant changes observed in serum albumin and globulin in 3 out of 7 patients.

Results of intestinal absorption test, vitamin B₁₂ absorption, serum vitamin B₁₂, serum and red cell folate levels are shown in Table 4. D-xylose tolerance test, protein and fat absorption tests were within normal limits but vitamin B₁₂ absorption was lower than normal in 8 out of 10 patients and serum vitamin B₁₂ level was also lower than normal in 4 out of 9 patients.

Histological study of jejunal biopsy were done on 8 patients. Normal mucosa, villi and lamina propria of jejunum was observed in 7 patients but in one case there was flattening of the jejunal villi, desquamation and erosion of mucosa in some areas but the lamina propria was normal. These changes are considered coincidental.

Table 2

Hematological study of patients with fasciolopsiasis.

Pt No.	Hct %	RBC/M	WBC/c. mm.	Differential white cell count %			
				P	L	E	M
1.	38.0	4.81	8,850	20	49	23	0
2.	29.5	2.98	5,150	61	24	14	1
3.	30.0	3.02	7,650	46	30	23	1
4.	37.0	3.96	9,650	24	28	56	2
5.	45.0	4.48	8,150	49	41	9	1
6.	38.0	3.46	6,750	49	28	22	1
7.	30.0	3.66	8,750	48	28	21	3
8.	-	-	-	-	-	-	-
9.	36.0	4.01	8,650	58	21	21	4
10.	34.0	3.81	9,150	51	27	12	4
Normal	44-52 38-46	4.5-5.5 4.0-5.0	4,000-10,000	50-70	20-35	2-4	2-6

P = polymorphs, L = lymphocytes, E = eosinophils, M = monocytes

Table 3

Biochemistry of patients with fasciolopsiasis.

Pt No.	Blood Sugar mg%	Albumin gm%	Globulin gm%	BUN mg%	Creatinine mg%	Cholesterol mg%
1.	76	3.3	3.3	10	0.6	150
2.	82	-	-	8	0.8	190
3.	90	-	-	8	0.9	190
4.	76	3.5	3.0	10	1.2	180
5.	84	4.4	2.4	14	1.1	300
6.	86	4.1	3.4	6	0.8	180
7.	90	4.2	3.5	10	0.4	170
8.	-	-	-	-	-	-
9.	110	3.9	2.6	12	0.9	148
10.	96	3.6	2.9	9	1.0	216
Normal	70-100	4-5.5	1.5-3.0	10-18	1-2	150-250

Table 4

Results of intestinal absorption tests, vitamin B₁₂ and folic acid levels in patients with fasciolopsiasis.

No.	D-Xylose tolerance gm/5hr	Protein losing test %	Sudan III drop/HD	Vit B ₁₂ absorption %	Serum Vit B ₁₂ pg/ml	Folic acid ng/ml	
						RBC	Serum
1.	3.4	0	3-4	14.77	78	183.6	8.1
2.	1.34	1.53	1-2	9.25	965	213.6	2.2
3.	-	0.88	6-8	23.68	385	182.4	2.9
4.	3.28	0.33	3-4	15.52	45	160.8	6.6
5.	2.2	0.08	4-6	30.15	50	156.0	2.9
6.	3.6	0.58	2-3	29.55	92	112.8	3.6
7.	4.0	0.59	5-6	56.43	340	280.8	12.3
8.	1.72	-	5-6	29.53	-	-	-
9.	1.6	0.49	2-3	48.96	66	199.2	8.7
10.	3.5	0.04	3-4	30.15	76	241.2	13.6
Normal	4.5-7.5	0-1.5	not more than 5 drops	50	200-1,000	90-570	3-21

DISCUSSION

There were no changes of carbohydrate, protein and fat absorption but vitamin B₁₂ absorption was slightly lower than normal.

Findings of normal D-xylose tolerance test were similar to those reported by Plaut *et al.*, (1969) who performed the test on 28 Thai patients with *F. buski* infection and found no difference from normal subjects.

There was no disturbance in serum biochemical values which was the same as that reported by Plaut *et al.*, (1969). These results are probably due to the very small number of worms, and all patients had no clinical symptom. Previous reports have indicated that *F. buski* infection of man is associated with clinical symptoms, malnutrition, oedema and possibly malabsorption in individuals with heavy worm loads. A fatal case described from Thailand yielded 466 worms at autopsy (Sadun and Maiphoom, 1953). The patient reported by Daengsvang (1941a), however, had severe diarrhoea, ascites, oedema and anemia, 221 worms were recovered after treatment. It would seem that *F. buski* is incidentally present in individual subjects with other causes of intestinal disturbances in the tropics.

Finding of low serum vitamin B₁₂ level and vitamin B₁₂ absorption in some patients with *F. buski* indicated that there was an impaired absorption of this vitamin. It was possible that *F. buski* also competing for vitamin B₁₂ led to loss of functional integrity of the ileum.

Hematological abnormalities observed in this study indicated slight anemia and relatively high eosinophilia. Most of the Thai people have lower hematocrit than normal and the common cause of mild anemia is due to iron deficiency (Wasi *et al.*, 1973). It was therefore possible that the mild anemia in these patients was due to iron deficiency and/or impaired absorption of vitamin B₁₂. As no other intestinal parasites were found in these patients, high eosinophilia was probably due to *F. buski* infection. All these findings indicated that *F. buski* was not harmful to man if present in small number.

SUMMARY

The intestinal absorption of carbohydrate, fat, protein and vitamin B₁₂, serum vitamin B₁₂, serum and red cell folate levels were

performed in 10 patients harbouring *F. buski*. No disturbance of carbohydrate, fat and protein absorption was observed but vitamin B₁₂ absorption was found to be slightly lower than normal in 8 out of 10 patients, and serum vitamin B₁₂ was also lower than normal in 4 out of 9 patients. Red cell and serum folate levels were within the normal limits. Histological study of jejunal biopsy was normal in 7 out of 8 patients.

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