

THE IMPACT OF SCHISTOSOMIASIS MASS TREATMENT ON HEPATO-SPLENOMEGALY IN NAPU VALLEY, CENTRAL SULAWESI, INDONESIA

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INTRODUCTION

Praziquantel is now the drug of choice for the treatment of the three species of *Schistosoma* namely *S. haematobium*, *S. mansoni* and *S. japonicum*. In 1980 a trial with praziquantel was initiated in Lindu Lake area (Joesoef *et al.*, 1980). Eighty two cases of schistosomiasis were included in this trial and the age-group ranged from 3 to 50 years. Among the cases, 11 had hepatomegaly, 16 with hepato-splenomegaly and one with hepato-splenomegaly and ascites. The dosage used was 35 mg per kg body weight given twice daily for one day. The cure rate was 88.6% six months after treatment; the effect of praziquantel on the size of the liver and spleen was not reported. Stephenson *et al.*, (1985) reported significant regression of splenomegaly and hepatomegaly in 202 children with *S. haematobium* infection, six months after treatment with metrifonate compared to the placebo group. Hayashi *et al.*, (1983) reported a marked reduction of hepatosplenomegaly in 78 cases treated with praziquantel, using a dosage schedule of 60 mg per kg body weight in divided doses in a day or as a single dose of 50 mg per kg body weight, with a follow up study of 4 years after treatment. A marked clinical improvement was observed in about 63% in each of the first three years after treatment. The rate increased to 79% in the 4th year after treat-

ment, showing a significant difference from the non-treated group.

In 1983 a mass treatment on schistosomiasis with praziquantel was carried out in Napu valley, Central Sulawesi. This paper reports a clinical study carried out in three villages in Napu valley namely Maholo, Winowanga and Tamadue with a total population of 233, 249 and 226 people respectively. The main objective was to determine the size of the liver and spleen before and 8 months after mass treatment with praziquantel.

MATERIALS AND METHODS

The material studied was based on 241 people who were chosen selectively from the data of the treated individuals. The cases selected were those who had undergone treatment with praziquantel as having a complete medical and faecal examination before and 8 months after treatment. Faecal examination was done according to modified Kato method (Katz *et al.*, 1972). Stool examination was carried out for 3 successive days and two modified Kato slides were prepared from each stool sample and examination was carried out to determine the presence of *S. japonicum* eggs. Determination of the enlargement of the liver and spleen was done by the modified Hackett technique (Pesigan *et al.*, 1958) and the enlarged part

was expressed in centimeter (cm). The liver rate, the degree of liver enlargement, as well as the spleen rate and degree of spleen enlargement were determined; the degree of liver and spleen enlargement were classified according to the gradings:

- Grade I = an enlargement between 1 and 3 cm
- Grade II = an enlargement between 4 and 6 cm
- Grade III = an enlargement between 7 and 9 cm
- Grade IV = an enlargement between 10 and 12 cm
- Grade V = an enlargement which was larger than 12 cm

The dosage of praziquantel used in the mass treatment campaign was 30 mg per kg body weight, given twice daily in one day. Similar re-examination of the liver and spleen was done 8 months after the mass treatment.

For statistical analysis, a chi-square method was used in this study.

RESULTS

A total of 241 individuals, 131 males and 110 females were examined. The overall percentage of stool positive cases of the differ-

ent age-groups ranged from 42.9 to 78.6% before treatment. The highest rate was found in the 20 to 29 year age group. After treatment the percentage of stool positives cases dropped drastically in all the age-groups (Table 1).

The examination results of liver enlargement showed significant reduction in the overall liver rate from 67.9% to 50.9% before and after treatment ($p < 0.01$). In the age group of 0-9 year and 10-19 year there was a significant decrease in the liver rate after treatment ($p < 0.01$) but not the other age-groups (Table 2).

The study of spleen enlargement showed that there was no significant decrease of the overall spleen rate before and after treatment ($p > 0.05$). There were also no significant differences of spleen rate changes in all the other age-groups before and after treatment (Table 3).

DISCUSSION

Praziquantel treatment on stool positive *S. japonicum* cases was shown to have drastically decreased the stool positive cases eight months after the mass treatment in Napu valley, Central Sulawesi. The treatment

Table 1

Results of faecal examinations for *S. japonicum* of 241 individuals in Napu valley.

Age group (year)	Total examined	Pre-treatment % positive	Post-treatment % positive
0 - 9	62	69.4	4.8
10 - 19	53	73.6	1.9
20 - 29	28	78.6	3.6
30 - 39	42	42.9	2.4
40 - 49	26	65.4	0.0
50 +	30	66.7	0.0
Total	241	65.9	2.5

Table 2

Age distribution of liver rate and degree of liver enlargement (graded) among the stool positive cases in Napu valley.

Age group	Total exam.	Pre-treatment					Post-treatment						
		Liver rate %	Liver enlargement					Liver rate %	Liver enlargement				
			1	2	3	4	5		1	2	3	4	5
0 - 9	45	80.0	15	18	3	0	0	55.6	16	9	0	0	0
10 - 19	41	90.2	9	14	10	4	0	63.4	8	16	2	0	0
20 - 29	19	36.8	4	1	1	1	0	36.8	2	4	1	0	0
30 - 39	18	44.4	1	7	0	0	0	50.0	1	7	1	0	0
40 - 49	17	52.4	1	7	1	0	0	47.0	1	5	2	0	0
50 +	19	57.9	4	6	0	0	1	31.6	2	3	0	1	0
Total	159	67.9	34	53	15	5	1	50.9	30	44	6	1	0

Table 3

Age distribution of spleen rate and degree of spleen enlargement (graded) among the stool positive cases in Napu valley.

Age group	Total exam.	Pre-treatment					Post-treatment						
		Spleen rate %	Spleen enlargement					Spleen rate %	Spleen enlargement				
			1	2	3	4	5		1	2	3	4	5
0 - 9	45	26.7	2	5	4	1	0	44.4	11	6	2	1	0
10 - 19	40	57.5	6	10	3	1	3	50.0	9	2	5	3	1
20 - 29	20	55.0	1	4	3	1	2	55.0	1	3	3	1	3
30 - 39	17	52.9	2	2	3	0	2	47.0	3	2	1	1	1
40 - 49	17	64.7	3	2	2	4	0	52.9	1	5	0	2	1
50 +	20	35.0	2	2	0	1	2	35.0	2	2	0	0	3
Total	159	45.9	16	25	15	8	9	47.2	27	20	11	8	9

also showed significant decrease of the overall liver rate especially in the younger age-groups but not the spleen rate. This might possibly be due to the presence of early stage of *Schistosoma* infection in the younger age-group where complete resolution of fibrosis might occur which are similar to that des-

cribed by Morcos *et al.* (1985). They stated that treatment of infected mice initiated 8 or 12 weeks after infection permitted nearly complete resolution of fibrosis. There was a clear shift from the higher degree of liver enlargement to a lower degree. This was not found in those cases with spleen enlargement.

The present results differ from that reported by Stephenson *et al.*, (1985) and Hayashi *et al.*, (1983). Their studies showed a reduction of both the spleen and the liver rate. Therefore, a long term study of patients treated with effective antischistosomal drugs is still needed to define whether liver fibrosis is reversible at any stage of human schistosomiasis infection.

SUMMARY

The impact of mass treatment with praziquantel on 241 individuals, 131 males and 110 females in Napu Valley, Indonesia was studied. The pre-treatment overall stool positive cases ranged from 43% to 79%, the highest in the 20-29 age group. Post-treatment follow-up study showed that the cases dropped to 2.5%. Significant reduction was seen in liver rate from 68% to 51% and in the age groups 0-9, 10-19, there was a significant decrease in liver enlargement after treatment, but not significant differences were seen in spleen rate in all age groups. This might be due to the early stage of *Schistosoma* infection in younger age groups where complete resolution of fibrosis might occur.

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REFERENCES

- HAYASHI, M., SHIMTANI, S., MATSUDA, H., TORNIS L.C., NOSENAS, J.S., and BLAS, B.L., (1983). Clinical study on hepatosplenomegaly schistosomiasis japonica in Leyte island, follow up study 4 years after treatment with praziquantel. *South-east Asian J. Trop. Med. Pub. Hlth.*, 15 : 498.
- JOESOEF, A., SYAMSUDDIN, N., SALMAN, K., OMAN, K. and HOLZ, J. (1980). Praziquantel trial in treating *Schistosoma japonicum* infection in Indonesia. *W.H.O.*, Manila, Philippines.
- MORCOS, S.H., KHAYAL, M.T., MANSOUR, M.M., SALEH, S., ISHAK, E.A., GIRGIS, N.I. and DUNN, M.A., (1985). Reversal of hepatic fibrosis after praziquantel therapy of murine schistosomiasis. *Amer. Trop. Med. Hyg.*, 34 : 314.
- STEPHENSON, L.S., LATHAM, M.C., KINOTI, S.N. and ODUORI, M.L., (1985). Regression of splenomegaly and hepatomegaly in children treated for *Schistosoma haematobium* infection. *Amer. Trop. Med. Hyg.*, 34 : 119.