

## Antimony Dimercaptosuccinate (TWSb) in the Treatment of Urinary Bilharziasis in Somalia

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In Somalia urinary bilharziasis, due to *S. haematobium*, is probably transmitted by *Bulinus abyssinicus*. In the Juba river zone the infection is seasonal, depending on periodic flooding and desiccation of ground depressions, called "descec," which, when flooded, allow for abundant multiplication of the snail, presumed to be the vector. In the middle Uebi Scebeli river zone, particularly in the agricultural region of the SAIS estate in Villa d'Abruzzi, the infection is continuous, in connection with extensive permanent irrigation.

The incidence of "kadi-dik" (bloody urine) in Somalia has not been systematically explored. Veneroni reported 30 per cent., Baruffa 20 to 80 per cent. from various localities of the lower Juba. Ayad found an over-all incidence of 41 per cent. among the population of the river valleys. Examining at random the urine of 55 subjects, age 4 to 55, 30 in the centre of Villa d'Abruzzi and 25 in the outlying farms, i.e., in the permanent irrigation zone of the middle Uebi Scebeli, we found 54 positives for hatching ova of *S. haematobium*, including 25 cases of gross macroscopic haematuria.

Lipparoni found treatment with tartar emetic, foudin and anthiomalin unsatisfactory, incriminating, as a major factor of failure, the lack of constancy shown by the Somali people in attending lengthy treatments.

Attempts by Baruffa and Maffi with a three-day Nilodin treatment were unsuccessful. In maximum bearable doses of 75-100 mg./kg., applied in two oral doses per day for three consecutive days, side-effects were prohibitive and therapeutic effects poor. Six weeks after the treatment, urine examinations for living ova were negative in only 9.5 per cent. of 84 patients.

Reports from Morocco (Friedheim), Egypt (Salem, Sherif and Friedheim) and S. Rhodesia (Alves) indicate that antimony dimercaptosuccinate "TWSb" might be an answer to the pressing need in Somalia for a safe, efficient,

short-term, ambulant treatment of bilharziasis under rural conditions.

In the following we report data from a clinical investigation designed to test the ability of TWSb to meet these requirements.

### PROCEDURES

TWSb was applied to the treatment of 25 cases of *S. haematobium* bilharziasis. The patients, 23 males and two females, aged four to 56, were Somali, Somali-Bantu and Bantu living and working and exposed to re-infection in the hyperendemic area of Villa d'Abruzzi. The treatment was ambulant and the patients continued, throughout the course, their routine occupation on the SAIS sugar estate.

The criterium for diagnosis and therapeutic effect was the presence, respectively absence, of living and hatching ova in the urine.

The treatment consisted of one course of four daily intravenous or intramuscular injections of a 10 per cent. solution of TWSb in normal saline. The single dose was 0.4 gm. in 18 adults weighing 54-76 kg. and 0.3 gm. in four children weighing 12-29 kg., and in three adults weighing 43-50 kg.

All 25 patients were followed up for at least six months. 19 for 9-10 months, four for 12 months, with 6-13 on the average urine examinations.

### OBSERVATIONS

Side-effects concerned mainly the gastro-intestinal tract. Ten patients vomited 2-3 hours after the penultimate and/or last injection. Vomiting was of the alimentary type in nine patients, repeated in one patient. One patient presented a temperature spike up to 38.2° C. Appetite was reduced towards the end of the treatment in approximately one-third of the patients. Two patients complained of fatigue.

Local tolerance was satisfactory. Two patients indicated tenderness at the site of one of the injections. Infiltrations, swelling and impaired function were not observed.

The first chemotherapeutic effect appeared as early as the first post-treatment day in the form of late hatching, globular, sluggish miracidia, swimming slowly in circles and followed later by dead miracidia.

In all cases hatching ova were absent from the urine by the end of the second post-treatment week. Haematuria disappeared within the same period.

Living, hatching ova and blood were absent from the urine in 19 out of the 25 patients followed up for six months (76 per cent.) and in 17 out of the 19 patients followed up further for 9-10½ months, and in four out of the four patients followed up for 12 months.

Hatching ova re-appeared in six patients during the second to fifth post-treatment month, and in two patients in small numbers, without blood, during the tenth post-treatment month. These two late relapses or re-infections occurred in the group which received a course of 4 x 0.3 g. No relapses appeared after six months in the 13 cases treated with 4 x 0.4 g. and followed up for nine to twelve months.

Following are patterns of post-treatment findings:\*

1. F., 4 years, 17 kg., 4 x 0.3 g., TWSb i.m.  
0 2 4 20 25 40 50 70 106 180 295  
303 351
2. M., 10 years, 29 kg., 4 x 0.3 g. TWSb i.m.  
0 2 4 20 25 40 50 70 106 180 295
3. M., 38 years, 63 kg., 4 x 0.4 g. TWSb i.v.  
1 9 48 52 85 111 125 131
4. M., 34 years, 76 kg., 4 x 0.4 g. TWSb i.v.  
1 3 10 24 34 44 70 97 128 179  
220 236 293.

\* The figures indicate post-treatment days on which urine control examinations were performed. Italic figures signify positive, ordinary figures negative, findings of living, normally hatching ova.

DISCUSSION

Patients No. 1 and No. 2 from the foregoing examples were sister and brother. The treatment of the four-year-old girl (patient No. 1) led to an uninterrupted record of negative findings throughout the 12-month follow-up period. Another sister, aged six, had in all respects an identical record. The brother, aged 10 (patient No. 2), resumed the elimination of hatching ova after 10 months. In contrast to his little sisters, he played in the river and had ample opportunities for re-infection.

In patient No. 3 oviposition ceased for three months and recommenced in the fourth month. A re-occurrence of this type may be interpreted as a recovery of damaged ovaries. Findings in patient No. 4 are suggestive of a spurious recovery of a chemically impaired ovary in the fourth month, followed by a further possibly definite cessation of ovarian function, witnessed, as it were, by the conspicuous absence of urinary ova during the fifth to tenth post-treatment months. Urine examinations alone are unable to tell whether these findings mean death or only castration of female worms. In the absence of rated immunological tests or *post-mortem* findings, there is no way of distinguishing a relapse from a re-infection.

Applying the criteria for usefulness of a bilharziasis treatment in Somalia, set forth in the introduction, it can be said that the treatment with TWSb is safe, in that it fails to cause major disturbances. Side-effects, such as vomiting, temperature spikes are at times bothersome, but not disturbing, as witnessed by the regularity with which the patients complete the course and the growing number of people volunteering for treatment. Factors favouring

Table 1

LONG RANGE EFFECT OF TWSB ON THE ELIMINATION OF VIABLE OVA  
IN URINARY BILHARZIASIS

Treatment	Follow-up Months	Number of Patients		
		Examined	Negative*	Positive†
Group of 18 patients treated with 4 x 0.4 g. i.m.	6	18	13	5
	9	1	1	0
	10	9	9	0
	12	3	3	0
Group of seven patients treated with 4 x 0.3 g. ....	6	7	6	1
	10	6	4	2
	12	1	1	0

\* Hatching ova in urine present.

† Hatching ova in urine absent.

the treatment include: the short four-day course; intramuscular application; the rapid effect on haematuria, which decreases within a week and disappears within two weeks; the ambulant treatment which, in the majority of cases, does not interfere with the daily routine of the patients.

The immediate drug effect was satisfactory, as judged by the disappearance in all cases of hatching ova in the first or second post-treatment week.

As to the evaluation of the long-range schistosomocidal effect, a proving ground less suitable than the hyperendemic area of Villa d'Abruzzi is hardly conceivable. Under these circumstances the absence of ova and haematuria in 19 out of 25 patients followed up for six months, and in 17 out of the 19 patients followed up further for 10 months, is significant, particularly so when compared with the poor therapeutic effects obtained in Somalia with tartar emetic, Fouadin and Nilodin.

#### CONCLUSION

TWSb, applied in a four-day course, is well suited for the ambulant treatment of urinary bilharziasis. The results obtained in Somalia in 25 patients followed up for six to ten months amply justify the use of TWSb on a larger scale. Further studies, with a view to optima, possibly shorter treatment schedules, are under way.

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#### Acknowledgments

The authors are indebted to H.E. the Minister of Health, Mogadiscio, for the authorisation, and to the Directors of the SAIS Company, Villa-bruzzi, for generous facilities to carry out this investigation. They thank Dr. M. Maffi, Malaria Adviser, Mogadiscio, who kindly established personal contacts.