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Urinary Schistosomiasis Treated with Sodium Antimony Tartrate—a Quantitative Evaluation*

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Summary: Seventeen Egyptian male farm-workers aged 8 to 27 years infected with Schistosoma haematobium were given twice-weekly intravenous injections of sodium antimony tartrate in a dose of 0.5 g. (30 mg.) per 15 kg. body weight for 12 injections. Bell's egg-count technique was used to evaluate results on 24-hour urine collections before and at 1, 4, 8, and 12 weeks after treatment. Patients were considered to be cured only when there were no eggs in the urine when examined by the filtration-staining, miracidial-hatching, and 24-hour urine-sediment examination methods.

At the final follow-up 14 out of 17 patients were found not to be passing eggs in the urine—an 82% cure rate. The mean reduction in egg output in the remaining three patients was 99%. These results are superior to any reported for other antimony drugs.

Introduction

We recently reported on the treatment of 34 Egyptian male farmers infected with schistosomiasis with sodium antimony dimercaptosuccinate (stibocaptate, Astiban) (Farid *et al.*, 1966, 1967a). Bell's (1963) quantitative egg-count technique was used to evaluate results. Three months after treatment the mean egg output was reduced by 90%, with a cure rate of 12% in patients infected with *Schistosoma haematobium* and 29% in those infected with *S. mansoni*. Bell (1964), using Astiban and approximately the same techniques to evaluate results of treatment, reported similar findings from East Africa.

Sodium antimony tartrate (tartar emetic), the first drug successfully used in the treatment of schistosomiasis, is still considered by many authorities to be the most effective schistosomicidal drug. It should therefore be used as a reference with which to compare therapeutic results obtained in the treatment of schistosomiasis with newer drugs. Applying the same techniques as those used in our previous study and working under the same hospital conditions, we treated with tartar emetic 17 Egyptian male farmers infected with *S. haematobium*. This paper presents our findings and compares them with our previous results and those of others.

Patients and Methods

Seventeen Egyptian male farm-workers aged 8 to 27 years infected with *S. haematobium* were treated with tartar emetic. They lived in the same villages from which previous patients had been obtained (villages in the Nile Delta, usually within 100 kilometres of Cairo). Bell's (1963) egg-count technique was used on 24-hour urine collections taken on two consecutive days before treatment and at 1, 4, 8, and 12 weeks after treatment. Repeated miracidial hatching tests were performed at the 12-week follow-up period. All patients were passing over 10,000 eggs per day and all were kept in hospital during the three-month follow-up period. Tartar emetic was given at a dosage of 0.5 g. (30 mg.) per 15 kg. body weight twice weekly for 12 doses. It was given intravenously slowly over a 10-minute period.

Ten of the 17 patients had received previous treatment with tartar emetic about a year before this study was undertaken, yet 13 of the 17 complained of severe haematuria accompanied by dysuria and four complained of terminal haematuria when admitted to hospital.

Results

The results are recorded in Tables I and II. A marked reduction in egg output occurred immediately after treatment

* The opinions and assertions contained herein are the private ones of the authors and are not to be construed as official or reflecting the views of the Navy Department, the Naval service at large, or the Egyptian Ministry of Public Health.

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in all patients (mean 98.3%). However, only 3 of the 17 patients ceased to pass eggs during the first week following the end of treatment. By the twelfth week of the follow-up period 14 had ceased to pass live eggs in the 24-hour urine collections—an 82.4% cure rate.

With Astiban he reported an 88% reduction in egg excretion and an 18% cure rate in patients with a mean egg excretion of approximately 50,000 per day (500 eggs per 10 ml. and assuming the total 24-hour urine collection to be about 1,000 ml.). Using 24-hour urine collections we (Farid *et al.*, 1966) reported a 90% reduction in egg excretion and a cure rate of 12% with Astiban—results rather close to those of Jordan. Our present results of treatment with tartar emetic are noticeably superior—a 99% reduction in egg excretion and an 82% cure rate.

TABLE I.—*Results of Treating 17 Cases of Urinary Schistosomiasis with Tartar Emetic at a Dosage of 0.5 g. (30 mg.) per 15 kg. Body Weight Twice Weekly for 12 Doses*

	Age in Years	Weight (kg.)	Total Dose		Egg Output, in Thousands per Day							
					Before Treatment	After Treatment						
						1 Week		4 Weeks		8 Weeks		12 Weeks	
			gr.	g.		Egg Count	% Reduction	Egg Count	% Reduction	Egg Count	% Reduction	Egg Count	% Reduction
Range ..	8–27	21–60	8·4–24	(0·54–1·55)	11·1–110·4	0–4·9	90·0–100	0–0·5	98·4–100	0–0·6	99·1–100	0–0·4	98·3–100
Mean ..	15·4	39	15·8	(1·02)	*44·1*	0·7	98·3	0·1	99·7	0·1	99·8	*0·1*	*99·8*
Number of patients ceasing to show any eggs in urine by filtration-staining technique						3 (17·6%)		7 (41%)		9 (52·9%)			
Number of patients ceasing to show any eggs in urine by filtration-staining, miracidial hatching, and 24-hour urine sediment examination technique												14 (82·4%)	

TABLE II.—*Comparative Results of Treatment of Schistosomiasis—Bell's Quantitative Egg-count Technique*

Authors	Country Clinical Trial Performed	Drug Used	No. of Cases	Mean Initial 24-hour Egg Output	Final Mean Percentage Egg Reduction at 2, 3, or 4 Months after Treatment	Cure Rate %
S. haematobium infection:						
Jordan (1967)	Tanzania	Astiban	22	50,000	88	18
Farid *et al.* (1966) ..	Egypt	Astiban	17	53,200	90	12
Present study ..	Egypt	Tartar emetic	17	43,000	99	*82*
S. mansoni infection:						
Bell (1964)	Tanzania	Astiban	12	118,200	91	33
Farid *et al.* (1967a)	Egypt	Astiban	17	89,000	88	29
Jordan (1966)	Tanzania	Ambilhar	40		76	35
McMahon and Kilala (1966)	Tanzania	Ambilhar	71		92	38
Lees (1967)	West Indies	Lucanthone	50	75,000	81	32

At the end of the six-week treatment course 15 of the 17 patients ceased to complain of dysuria and frank haematuria. Proteinuria ceased in all but one patient. In addition, marked functional and radiological improvement occurred in five patients (Farid *et al.*, 1967b).

Vomiting occurred in six patients, but was not severe enough to warrant stoppage of treatment. Spasmodic cough occurred in nine patients, usually a few minutes after completion of the intravenous injection. A rise in temperature up to 102° F. (38.9° C.) was recorded in four patients, being accompanied by marked eosinophilia in two (up to 68% of the differential white cell count). The temperature subsided on administering an antihistamine and postponing injections for a few days.

Discussion

A leading article in the *British Medical Journal* (1966) stressed the importance of evaluating the intensity of infection by quantitative counting of the egg output when assessing results of schistosomiasis. With the introduction of Bell's egg-count technique a method of indirect estimation of intensity of schistosomiasis infection became available.

Jordan (1967) used a quantitative method to evaluate results of treatment of urinary schistosomiasis but counted eggs in a small collection of urine and not in a total 24-hour collection.

Table II shows the results of treatment of schistosomiasis with Astiban, Ambilhar (niridazole), and lucanthone (Nilodin). Bell's egg-count technique was used and results were evaluated two to four months after treatment. The final results are remarkably similar, whether reported from East Africa, Egypt, or the West Indies—a 76 to 92% reduction in egg output in both *S. haematobium* and *S. mansoni* infections, but a 12 to 18% cure rate for *S. haematobium* infection and a 29 to 38% cure rate for *S. mansoni*. It is disappointing that similar studies with tartar emetic in the treatment of *S. mansoni* infection have not yet been reported for comparison.

We recognize the difficulty of treatment of schistosomiasis with tartar emetic. The drug has to be given intravenously, the course of treatment is long, toxic reaction may occasionally be severe, and its use for mass treatment of patients is difficult, yet it remains an excellent schistosomicidal drug and should be used as the reference drug with which to compare therapeutic efficacy of other antischistosomal compounds.

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