

The Treatment of Schistosomiasis *Mansoni*¹

Evaluation of the Parasitotropic Effects of Fuadin and Tartar Emetic

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A PREVIOUS REPORT² presented the results obtained in treating with fuadin 157 patients suffering from schistosomiasis *Mansoni*. Repeated examinations performed during a reasonably prolonged period showed that the ova of *S. mansoni* had disappeared from the stools of 58.6 percent of these cases. The purpose of the present study is to compare the parasitotropic effects of fuadin and tartar emetic in the treatment of this tropical condition.

MATERIAL AND METHODS

Every patient visiting the Outpatient Clinics of the University Hospital and found passing *S. mansoni* ova was subjected to treatment. No attempt, however, was made to classify patients into early, moderately advanced, or advanced schistosomiasis, and no consideration was given to the number of ova passed. In view of these circumstances, it seems justifiable to compare both groups treated.

Five cc. of fuadin were administered intramuscularly in the gluteal region on Mondays, Wednesdays, and Fridays. Tartar emetic was given intravenously, five cc. of a one percent solution being injected on the same days as the fuadin. Patients were required to come to the clinic without breakfast, a rather necessary precaution whenever intravenous therapy with heavy metals is undertaken. In each instance the injections were administered by a nurse who had instructions to inject the tartar emetic very slowly. It is claimed that, if this solution is diluted with blood, coughing can be prevented; however, it was found that coughing was avoided by slow administration, provided no dose higher than five cc. were utilized. The solution of tartar emetic³ was obtained in the local market in sealed glass ampoules.

Examination of unpurged stool specimens was performed every two weeks by the De Rivas technique, as modified by one of us (J.O.G.).⁴

1. Received for publication June 17, 1945.

2. F. Hernández Morales, The treatment of schistosomiasis. Puerto Rico J. Pub. Health and Trop. Med., 20:497-504, 1945.

3. Antimony potassium tartrate.

4. F. Hernández Morales and J. Oliver González, Ova of *S. mansoni* in purged and unpurged fecal specimens. Puerto Rico J. Pub. Health and Trop. Med., 21:209-211, 1945.

1. *Treatment with fuadin.* Two hundred and two patients were treated with one series of fuadin, a total dose of 45 to 50 cc. being administered in each case.

Seventy-six (37.62 percent) had ova in the stools when examined anywhere from 15 days to 34 months later. Forty-one were positive within six months after termination of the treatment. The appearance of eggs in the stools six months or more after was indeed a very interesting finding, as the possibility of reinfection could not be disregarded. Since there is no other means available, many of these patients have to bathe in infected streams.

In four patients (1.98 percent), the ova never disappeared from the stools during treatment. One hundred and twenty-two (60.4 percent) were found to be ova-free when examined anywhere from one day to 11 years after the end of treatment. One hundred and six (52.45 percent) had repeated stool examinations three months or more (3 months to 11 years) after the treatment ended, but no ova of *S. mansoni* were found.

Sixty-six patients received a second course of fuadin (45 to 50 cc. each). Thirty-four (51.51 percent) were found with ova in the stools during the follow-up period. In twenty-five (73.58 percent) ova appeared within six months. Thirty-two patients (48.49 percent), followed up for 15 days to 39 months, were found ova-free. Only five were followed less than three months, while twenty (30.30 percent) were kept under observation for more than six months.

A third series of fuadin was administered to thirty-six patients. Twenty-three (63.88 percent) of them were found positive for *S. mansoni* ova. Seven of these cases had positive stools after six months of follow-up; three after 27, 37, and 48 months, respectively.

In thirteen patients the stools remained negative. However, one of these was followed up for only 12 days, while two others were followed up for 45 days each. Ten (27.77 percent) were under observation for at least four months.

COMMENTS

The results tend to demonstrate that, when the first course of fuadin proves unsuccessful, further administration of the drug is less and less efficacious. In other words, the schistosome seems to develop resistance to the drug.

A total of 304 patients was treated with fuadin (202 with one course; 66 with two, and 36 with three), yet 137 were still found harboring *S. mansoni* ova sometime during the follow-up period, an incidence of 45.06 percent. The greatest number of recurrences

occurred within the first six months with a total of 96 cases (70 percent of the positives).

Toxic symptoms developed rarely and consisted nearly always of joint pains. No deaths occurred. One patient, not included in this series, had epistaxis during treatment. All patients were ambulatory and able to continue their usual daily activity.

2. *Treatment with tartar emetic.* Thirty-five patients were given one course of 60 cc. of tartar emetic. The stools of twelve patients (36.36 percent), followed up from six and one half to nineteen months after cessation of treatment, were free of *S. mansoni* ova. If four other cases observed for less than six months are included, then the percentage of cures rises to 48.48. In only one instance did the stools contain ova immediately after the treatment had been completed.

Treatment was stopped in two cases because of toxic reactions. One of these developed impairment of vision in the right eye; examination by the ophthalmoscope and the slit-lamp revealed a large, irregular grayish spot close to the macula, which disappeared slowly on discontinuation of the drug. This same patient was administered fuadin somewhat later, but even this drug had to be stopped because epistaxis developed after only five injections had been administered. The other patient felt dizziness after each injection, so the drug was discontinued when 25 cc. had been given.

Two patients, who had become positive, were given one more course of 60 cc. of tartar emetic. Both were followed up for 11 and 17 months, respectively, at which time the stools were ova-free.

Twenty-two patients received a course of 120 cc. each. Twelve were followed for more than two months (3 to 12 months). On repeated examinations, their stools were found free of eggs, a percentage of 54.54 of cures. If three other cases followed for less than three months are included in this group, the percentage rises to 68.18. Five patients had received previous treatment with fuadin, yet their stools had become positive. Four of them were treated successfully, as repeated stool examinations showed no ova of *S. mansoni* at the end of seven, ten, and eleven months (2 cases), respectively.

One patient developed phlebitis and periphlebitis; another felt some dizziness and weakness, but treatment was continued in both.

Thirteen patients received a second course of 120 cc. of tartar emetic; two of them had taken fuadin previously. Ten had also received a previous series of 60 cc. of tartar emetic, and one had had a course of 120 cc. of the same drug. In three patients (23.7 per-

cent), ova appeared in the stools one and a half, two and one half, and six months, respectively, after the end of treatment. Ten patients (76.3 percent) were followed up anywhere from two to twenty-three months and found to have no ova of *S. mansoni* on repeated examinations (every 2 weeks).

None of these patients developed toxic reactions.

DISCUSSION

From the above results, one feels justified in stating that tartar emetic appears to have a very definite parasitotropic effect against *S. mansoni*, when administered in courses of at least 120 cc. of a one percent solution. Toxic reactions occurred in only a small number of instances but were never very serious. Though cautioned not to do heavy work, all patients were ambulatory and were able to continue their regular activities. No deaths occurred.

Treatment of schistosomiasis *Mansoni* with fuadin and tartar emetic shows that the latter drug, when administered in courses of at least 120 cc. of a one percent solution, has a slightly stronger parasitotropic effect than fuadin. However, the ease with which fuadin may be administered, the shorter period of treatment it requires, and its fairly low toxicity makes this drug the one of choice.

The authors recommend that whenever the first course of fuadin proves unsuccessful in eradicating the infection, other antimony preparations be used. Further administration of fuadin proves successful in only a very small percentage of cases.

SUMMARY AND CONCLUSIONS

Two groups of patients, suffering from schistosomiasis *Mansoni*, were treated with fuadin and tartar emetic, respectively. A first course of fuadin produced about 60.4 percent of apparent cures. A second course brought about only 48.49 percent cures, while a third course was effective in 36.22 percent of cases only.

When administered in courses of 60 cc. of a one percent solution, tartar emetic was effective in about 36.36 percent of cases. Its effectivity increased, however, to 68.18 percent when 120 cc. were given. A second course of 120 cc. increased the percentage of effectivity to about 76.3 percent.

In spite of the superiority of tartar emetic over fuadin in the treatment of this tropical condition, fuadin is believed to be the drug of choice. It is easier to administer, and the period of treatment involved is shorter.