

## TREATMENT OF ASCARIASIS WITH PIPERAZINE AND A SURFACTANT AGENT

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### SUMMARY

146 ascariasis cases were given single-dose treatments of piperazine, and piperazine with tyloxapol.

Results showed that the combination of piperazine with tyloxapol was significantly effective against ascarides.

### INTRODUCTION

Salts of piperazine were first used for the treatment of ascariasis by Fayard, in 1949; it has later been proved that these compounds produce the best results in ascariasis therapy<sup>4, 5, 6, 10</sup>.

Different Authors referred to the possibility of obtaining satisfactory results with the administration of a single dose of piperazine (ATCHLEY, WYSHAM & HEMPHILL<sup>1</sup>; BROWN<sup>4</sup>; FERNÁNDEZ DE CASTRO<sup>7</sup>; FIELDS, SELLY & GUICHERIT<sup>8</sup>, TARNAY *et al.*<sup>11</sup>). Other drugs have not proved satisfactory when given in a single dose (HOEKENGA<sup>9</sup>).

There is no doubt about the advantages of a single-dose treatment, for it rules out failure to follow through with therapy, and makes mass treatment possible.

Evidence has been obtained recently in favor of the belief that infectivity of *Ascaris* eggs in the soil decreases rapidly under natural conditions (BIAGI & RODRÍGUEZ<sup>3</sup>). If new contamination could be avoided for some time, by mass treatment of the population, eradication of ascariasis might be accomplished. Hence the need for a highly effective drug for single-dose treatment.

The addition of a surfactant agent to piperazine was designed to favor penetration of the drug into the worms. The purpose of this study is to find out if the vermifuge

effect of piperazine increased when a surfactant is added to the medication.

### MATERIAL AND METHODS

146 treatments were given to 134 ascariasis patients of different age groups, as shown in Table I. A single dose of 100 mg of piperazine per kg bodyweight, and not exceeding 4 gm was administered orally in the form of a syrup (100 mg piperazine hexahydrate per cc). In 63 cases piperazine\* was used alone, and in 83 tyloxapol\* was added to the syrup (2 mg tyloxapol for each cc of syrup). No laxatives were given, no special diets followed.

TABLE I

Number and age of patients.

Age	No. of persons
6 — 23 months .....	10
2 — 6 years .....	49
7 — 14 years .....	65
Adults .....	4
Uncontrolled .....	6

Therapeutic results were evaluated in each case by three parasitoscopic examinations of the feces with egg counts before the

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\* Bryrel, and Bryrel with Superinone, Winthrop Products Inc.

treatment, and three examinations 8 days after the treatment. The Ferreira (BIAGI & GONZÁLEZ<sup>2</sup>) method was used for the egg counts, and the "double blind" procedure was followed in the management of patients, drugs and stool samples, in order to avoid subjective errors on the part of the investigator.

Results were based on the average of ascaris eggs per gram of feces (e.g.f.) before and after the treatment. The percentage of decrease in number of eggs ( $\downarrow$  %) shows the therapeutic result of each treatment. A complete eradication corresponds to  $\downarrow$  100%.

#### RESULTS AND COMMENTS

Table II shows the number and percentage of cases in which different degrees of parasite reduction was obtained, from an elimination of approximately one third of the parasites (0.39%  $\downarrow$ ), to total clearance.

TABLE II

Effectiveness of piperazine alone and piperazine with a surfactant agent in ascariasis.

% $\downarrow$ *	Piperazine (63 cases)		Piperazine plus Tyloxapol (83 cases)	
	No.	%	No.	%
0 — 39	8	12.7	9	10.8
40 — 69	4	6.4	2	2.4
70 — 100	51	80.9	72	86.8
100	41	65.0	67	80.7

\* Percentage of the decrease in the number of eggs per gram of feces after treatment.

It is quite evident that piperazine with tyloxapol produces better results; the superiority of this combination is more evident in the group that obtained parasitologic cure, showing a significant statistical difference (P 0.05). We cannot explain the mechanism by which tyloxapol increases the effect of piperazine, but it might be by favoring penetration of the drug into the parasite.

No signs of intolerance were observed. Children accepted the syrup willingly.

#### RESUMO

#### Tratamento de ascaridíase com piperazina e um agente detergente.

146 casos de ascaridíase foram tratados com dose única de piperazina, e piperazina + tyloxapol.

Os resultados demonstraram que a combinação piperazina + tyloxapol é significativamente eficiente no combate aos *Ascaris*.

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