FIG. 1.—(a) Chest x-ray taken at the age of 1 hour showing bilateral pneumothorax. (b) Chest x-ray at 24 hours showing catheters in situ and complete re-expansion of both lungs.

poor. Pneumonia acquired *in utero* was suspected, and the baby was attached to a mechanical ventilator. Chest x-ray taken at this stage showed bilateral pneumothorax (Fig. 1a). Argyle catheters size Fr. 12 were introduced into the pleural cavity on either side through midpoints between clavicle and nipple. A Heimlich valve was attached to each catheter (Fig. 2). The pneumothorax had disappeared and the lungs fully expanded by the following day (Fig. 1b). The baby made an excellent recovery.

FIG. 2.—Baby with Argyle thoracic catheters and Heimlich valves in place.

It is suggested that drainage of tension pneumothorax using the above equipment should replace the less efficient and more cumbersome underwater seal method.

Summary

A technique for draining pneumothorax in the newborn is described. The equipment used, which is available commercially, has advantages over the more cumbersome underwater seal.

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A. RAMACHANDRA and GEORGE RUSSELL*
Aberdeen Maternity Hospital and Department of Child Health, University of Aberdeen, Aberdeen.

*Correspondence to Dr. George Russell, Department of Child Health, University Medical Buildings, Foresterhill, Aberdeen AB9 2ZD.

Comparison of Pyrantel Pamoate with Other Anthelmintic Drugs

Pyrantel pamoate (Combantrin) is a new single-dose anthelmintic agent, effective against infestations with *Enterobius vermicularis*, *Ascaris lumbricoides*, *Ancylostoma duodenale*, and *Necator americanus* in

children and adults. In extensive trials cure rates of over 90% have been shown in roundworm, hookworm, and threadworm. The purpose of this study was to determine the efficacy of a single dose of pyrantel in the treatment of human infestation with hookworm and roundworm when compared with buphenium and piperazine.

Pyrantel pamoate is chemically different from existing anthelmintic agents. It acts by means of a neuromuscular blocking effect, immobilizing ascaris and so leading to their safe excretion without excitation or migration of the parasite. It is effective against both the mature and immature forms of susceptible helminths in the intestine.

Materials and Methods

Fifty patients were included in the trial. Subjects positive for hookworm by merthiolate iodine formalin concentration technique (MIFC), and for roundworm ova on stool examination, were selected for study and hospitalized. Of these 50 patients, 32 were boys and 18 girls; their ages ranged from 2 to 16; the mean was 8.5 years. Faecal egg counts for hookworm of 24-hour specimens were undertaken for 6 consecutive days preceding treatment; and for 10 days after treatment according to Stoll's egg dilution technique. Physical characteristics of the 24-hour stool specimen were recorded to assess the worm load.

Coproculture was undertaken in cases of hookworm on one pretreatment day and also on the last post-treatment day (Marston, 1965). Two days before drug administration baseline values of Hb, RBC, WBC, and differential leucocyte counts were determined; urine was examined for albumin, sugar, and centrifuged deposit; and serum bilirubin, alkaline phosphatase, SGOT,

SGPT, and blood urea were determined. These studies were repeated on the 3rd and 10th post-treatment days.

Negative stool tests for ova and negative coproculture 10 days after treatment were the criteria of successful treatment in hookworm cases, while negative stool tests for ova 6 days after treatment was the criterion of successful treatment in roundworm cases.

All 24-hour stool specimens were suspended and passed through mesh gradients of 6, 12, 24, and 60 meshes to retrieve adult worms.

The mean output of hookworm ova over 6 pre-treatment days was calculated in terms of number of hookworm ova per 24-hour stool, and similarly on the 6th post-treatment day for roundworms, and 10th day after treatment for hookworm.

A dosage schedule of 10 mg and 20 mg/kg for pyrantel pamoate and 2.5 g base of buphenium hydroxynaphthoate were employed in hookworm cases. In roundworm infestation 10 mg/kg of pyrantel pamoate and 120 mg/kg of piperazine citrate were employed.

Results and Comments

Our findings confirm those of other workers in showing that pyrantel pamoate is highly effective against both roundworm and hookworm. Table I shows that 13 of 15 (87%) patients with roundworm were cured with pyrantel, and 7 of 10 (70%) with piperazine. These numbers are small but workers from Taiwan, Egypt, and Korea (Hsieh and Chen, 1970; Bell and Nassif, 1971; Rim and Lim, 1972) have also reported cure rates between 90 and 100%. Pyrantel has proved consistently superior to piperazine in comparative trials (Kobayashi *et al.*, 1970; Bell and Nassif, 1971).

TABLE I
Roundworm, Average Ova Count Before Treatment and on 6th Post-treatment Day: Comparison of Pyrantel with Piperazine

Pyrantel Pamoate (15 Cases)			Piperazine (10 Cases)		
Case No.	Average Pretreatment Ova Count/Day per 1000	Ova Count/1000 on 6th Post-treatment Day	Case No.	Average Pretreatment Ova Count/Day per 1000	Ova Count/1000 on 6th Post-treatment Day
2	135	0	1	359	0
4	361	0	3	1673	210
6	4656	128	5	231	0
8	1616	0	7	4170	125
9	1976	0	11	950	0
10	1537	0	12	191	0
13	311	0	15	214	0
14	7724	280	16	245	0
18	294	0	17	46	0
19	1054	0	25	3510	318
20	280	0			
21	107	0			
22	320	0			
23	209	0			
24	695	0			
Mean	1412		Mean	1159	

TABLE II

Hookworm, Average Ova Count Before Treatment and on 10th Post-treatment Day: Comparison of Pyrantel with Bephenium

Pyrantel Pamoate (17 Cases)			Bephenium (8 Cases)		
Case No.	Average Pretreatment Ova Count/Day per 1000	Ova Count/1000 on 10th Post-treatment Day	Case No.	Average Pretreatment Ova Count/Day per 1000	Ova Count/1000 on 10th Post-treatment Day
1	252	0	3	995	0
2	802	0	7	221	110
4	22	0	8	30	0
5	114	0	15	2506	0
6	49	0	16	211	0
9	46	0	17	18	0
10	1183	0	19	368	0
11	63	0	20	427	156
12	231	0			
13	242	0			
14	42	0			
18	16	0			
21	117	0			
22	315	52			
23	191	0			
24	2693	1536			
25	874	330			
Mean	427		Mean	297	

Table II shows that 14 of 17 (82%) patients with hookworm were cured; these included 6 of 7 infected with *A. duodenale* and 6 of 8 with *N. americanus*. Hsieh and Chen (1970) from Taiwan reported cure of 91% of 35 patients with *A. duodenale*. Others from Japan, Korea, and Egypt have reported similarly high cure rates between 90 and 100% (Bell and Gould, 1971; Ishizaki, 1971). *Necator* infestations are notoriously more resistant to treatment than those with *Ankylostoma*. Many reports in larger series indicate cure rates between 70 and 90%, or reductions in stool egg counts of up to 96 or 98% (Cervoni and Oliver-González, 1971; Hsieh and Chen, 1970).

Comparative trials against bephenium with both species of hookworm have shown pyrantel to be equal or superior to bephenium in efficacy, and to have had a significantly lower incidence of unpleasant side effects (Ishizaki, 1971). Pyrantel pamoate is well tolerated and occasional side effects noted were mild.

Summary

A clinical and parasitological study was carried out on 50 patients suffering from hookworm and roundworm infestations to compare the effectiveness of pyrantel pamoate with that of bephenium and piperazine. The findings, assessed by faecal egg counts before and after treatment and by coproculture in the case of hookworm, confirm those of other workers and indicate that pyrantel

is superior to bephenium in hookworm infestation. In roundworm infection it is very effective, and superior to piperazine.

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RAZIA J. RAHMATOOLA, M. A. HALIM, F. A. LARI, TOFAYEL AHMED, RAFAT SHAMIM, and M. SULEMAN
Jinnah Postgraduate Medical Centre, Karachi, Pakistan.

*Correspondence to Dr. Tofayel Ahmed, P.O. Box 5107, Karachi, Pakistan.