

Oral Atropine Sulfate for Infantile Hypertrophic Pyloric Stenosis

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This study aimed to evaluate the effectiveness of oral atropine in the management of IHPS. Cases were diagnosed clinically and confirmed sonographically. Atropine was given orally from the outset at a dose of 0.18mg/kg/day in eight divided doses, increased daily by 1/4th of the commencing dose till vomiting ceased. Ultrasonographic evaluation of pyloric muscle thickness and length was done at the commencement of treatment, after completion of treatment and at 3,6,9,12 and 15 months follow up. Oral atropine was effective in 11/12 (91.06%) cases. Vomiting ceased in 14 to 21 days in all cases. One case required initial 7 days of I.V. treatment followed by 18 days oral treatment to stop vomiting. USG evidence of normalization of pylorus was observed in all these cases, 3-15 months after completion of treatment. We conclude that oral atropine proved to be a simple, effective, safe, very cheap and acceptable treatment option for IHPS.

Key words: *Infantile hypertrophic pyloric stenosis (IHPS), Oral atropine sulfate.*

FREDET-RAMSTEDT operation is the treatment of choice for infantile hypertrophic pyloric stenosis, but trials of medical management with intravenous atropine sulfate (1,2) and more recently with oral atropine(3) have shown encouraging results. So, to further evaluate the effectiveness of oral atropine, we tried oral atropine on 12 patients reporting at Child Care Center, Patna.

Subjects and Methods

Trial period stretched from January 2000 to July 2003 and included 12 confirmed cases of IHPS hospitalized at Child Care Center, Patna, India. Parents were explained the purpose of trial and written consent was obtained. The diagnosis was made clinically and confirmed sono-graphically. All patients were free of any other disease. Treatment began with gastric decompression using nasogastric tube followed by atropine sulfate at a dose of 0.18 mg/kg/day in eight divided

doses via the same naso-gastric tube. Patients were fed 20 minutes after medication. Amount and type of feed was not restricted. The dose was increased by 25% every day. Patients were discharged from the hospital when vomiting reduced to 1 episode every 6 hours. Patients were discharged with the advice to keep increasing the dose by 25% every day till vomiting ceased and then continue on the same dose for remaining days till 3 weeks. All patients were advised to report after 7 days of discharge for assessment of liver and renal function. They were advised to keep a daily record of vomiting. Ultrasonic evaluation of pyloric muscle was done in every patient at the end of treatment and at 3, 6, 9, 12 and 15 months follow up to check the regression in the hypertrophy. Ultrasonic assessment of thickness of pylorus was done by measuring the distance of the hypo echoic area between the submucosa and the outer margin of the muscle. Length of the pyloric canal was then

assessed by measuring the distance between the pyloric and duodenal end.

Results

Table I depicts details of patient characteristics and response to therapy. In 11 patients vomiting episodes were reduced to 1 episode every 6 hours within 24 to 48 hours of oral treatment during hospitalization. They all became vomiting free within 14 to 21 days of home treatment with oral atropine. One patient (No.10) required 7 days of IV atropine to reduce his vomiting frequency to 1 episode per 6 hours but responded well thereafter to become vomiting free with 18 days of oral atropine at home. All these 12 patients made uneventful recovery after oral treatment. Ultrasonic evidence of normalization of pylorus was observed 3 to 15 months after completion of oral treatment. None of the patients experienced significant side effects.

Discussion

Atropine sulfate is absorbed from the intestine. In earlier trials(1,2) atropine was initially given by IV route followed by oral route because it was suspected that dilution with gastric contents and delayed emptying might not allow desirable amount of atropine to reach intestine in desirable time. However, the fact that oral atropine was effective in 91.6% cases, indicates that the objective of reaching the intestine can be achieved if oral treatment is started with a relatively higher dose. We started with 0.18 mg/kg/day, which is about 3 times the conventional commencing IV dose because firstly, the effective oral dose is double of IV dose(4) and secondly we had to counter the aforementioned factor. Although home treatment was given for 2 weeks in all patients, the variations in actual curing days could be due to variations in the endogenous production of neurotransmitters,

TABLE I—Patient Characteristics and Response to Therapy.

Sl. No.	Age (days)	Duration of symptoms (days)	Thickness/length of pyloric canal	No. of days of hospitalization	No. of days of home treatment required to stop vomiting	Total duration of home treatment irrespective of vomiting status (days)	Normalization of pylorus (months)
1	25	7	3.6 mm/16.9 mm	1	15	21	6
2	17	9	4.2 mm/17.8 mm	1	17	21	6
3	27	6	3.9mm/16.6 mm	1	14	21	3
4	18	11	5.7mm/19.6 mm	2	18	21	12
5	33	18	8.7mm/21.4 mm	2	20	21	12
6	52	21	8.1 mm/24.1 mm	2	18	21	12
7	16	3	3.1 mm/16.2 mm	1	14	21	3
8	24	7	3.9 mm/16.8 mm	1	16	21	6
9	36	15	6.3 mm/22.2 mm	2	19	21	12
10	60	21	9.3 mm/25.9 mm	2+7 (I.V. treatment)	18	21	15
11	18	4	3.4 mm/16.3 mm	1	21	21	6
12	16	2	4.5 mm/19.3 mm	1	15	21	3

Key Messages

- Home treatment with oral atropine appears to be a simple, effective, cheap and more acceptable in treatment of IHPS.
- Confirmative trials are required before oral atropine can be routinely recommended as an alternative.

subjective differences in the sensitivity of muscarinic receptors and drug delivery and clearance system. Ultrasonography was used for confirmation because it is a reliable tool for measurement of thickness and length and confirmation of diagnosis(5-7). The fact that 11 out of 12 patients (91.6%) were cured and had normalization of pylorus with oral atropine, speaks volumes about the effectiveness of this treatment option. Similar results were observed by Kazako O, *et al.* in their trial with oral atropine(3). Treatment cost with oral atropine is almost negligible in comparison to IV treatment and surgical correction. Besides, surgery has its associated risks (8-10). Normalization of pylorus takes 2-12 weeks(11) with surgery, 3-15 months(1,2) with IV atropine, and in this study it took 3-15 months, which is fairly acceptable. Although not significant, the main lacunae of this trial is related to its main advantage *i.e.*, home treatment and includes possibility of inaccurate dosing and inability to have a precise day to day weight pattern and early recognition and treatment of any electrolyte imbalance that might develop during home treatment. We conclude that in this trial oral atropine proved to be simple, effective, safe, cheap and acceptable treatment option for IHPS.

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