



Medical management of Infantile Hypertrophic Pyloric Stenosis

* Dr. Sameer Mhatre

Associate Professor, Department of Paediatrics, Smt. Kashibai Navale Medical College and General Hospital, Narhe, Pune- 411041,
*Corresponding author

Dr. Subhashchandra Daga

Professor, Pacific Medical College & Hospital, Bhilon ka Bedla, Pratap Pura, N.H.27, Teh-Girwa Udaipur, Rajasthan, India-313001

ABSTRACT

Introduction: Infantile hypertrophic pyloric stenosis (IHPS) is the most common cause of gastric outlet obstruction in infancy. It is treated surgically by pyloromyotomy. Medical management with atropine sulphate has been reappraised as an option for IHPS.

Patients and Methods: Our study population consisted of 4 patients of IHPS admitted in the hospital. The parents of these patients had refused surgical treatment. All four of them were treated medically using atropine.

Results: All four patients were successfully managed with atropine. We evaluated ultrasonography findings of these patients before and after medical management and documented improvement. Vomiting ceased and significant weight gain was seen in all four patients. There were no complications noted.

Conclusion: This study shows there is definite role of atropine in management of IHPS in special situations.

KEYWORDS : IHPS, Atropine, Medical Management.

Introduction

Infantile hypertrophic pyloric stenosis (IHPS) is the most common cause of gastric outlet obstruction in infancy. It presents as one of the most common surgical conditions of infancy (1) and is seen in 1 to 3 of every 1000 live births (2) with 4:1 male-to-female ratio. IHPS occurs secondary to hypertrophy and hyperplasia of the muscular layers of the pylorus, causing a functional gastric outlet obstruction. The exact etiology and pathogenesis of IHPS however are unknown.

The definitive treatment of IHPS is surgical pyloromyotomy known as Ramstedt's procedure (3). Medical management with atropine sulphate has been reappraised as an option for IHPS. Some of the recent studies with atropine in IHPS have shown significant success rates. The present study evaluated the effectiveness of atropine in IHPS in a rural setting.

Patients and Methods

Our medical institute M.J.M.E.R Medical College and Dr.Bhausaheb Sardesai Talegaon General Hospital caters to most of rural population and has no pediatric surgeon faculty available. We refer all our pediatric surgical cases to tertiary care center at Pune.

Our study population consisted of 4 patients of IHPS admitted in NICU from September 2011 to March 2013, who refused surgical management and going to tertiary care center. Encouraging results with atropine as mentioned in literature (Nelson textbook of Pediatrics 20th Edition and International Journals) prompted us to treat these patients with atropine, after taking due consent.

Hypertrophic pyloric stenosis in these patients was diagnosed based on -

- A) Typical history of frequent non-bilious projectile vomit,
- B) Pyloric muscle thickness ≥ 4 mm and pyloric canal length ≥ 15 mm on abdominal ultrasonography.

Treatment regimen

Treatment began with correction of dehydration and electrolyte imbalance with appropriate fluids. Medical management with atropine was used in all 4 patients. Atropine was given at a dose of 0.01 mg/kg/day intravenously over 5 minutes in a syringe pump every 4 hours.

ly. Patients were fed 20 minutes after atropine administration with 10 ml expressed breast milk initially. The volume of milk feed was increased gradually until each patient tolerated total milk volume of 120 ml/kg/day. When vomiting had ceased for a period of 1 day, intravenous atropine was changed to oral atropine at the dose of 0.02 mg/kg 6 times a day, 20 minutes before feeding. Patients were kept hospitalized until full feeds were tolerated for 2 days without vomiting on oral atropine. On discharge, patients were continued on oral atropine for 1 month at the same dose.

Table 1
Clinical profile of patients-

	1	2	3	4	Mean	SD
Sex	male	fe-male	male	fe-male	-----	-----
Age of presentation (days)	21	35	30	27	28.25	5.06
Weight at presentation (Kgs)	1.950	2.560	2.645	2.540	2.423	0.27
Period for Intravenous atropine given (days)	5	4	5	8	5.8	1.5
Period of hospitalization (days)	15	10	11	14	12.5	2.06
Weight gain after 1 month of oral atropine (grams)	500	650	900	820	717	154

Table 2
Ultrasonography findings at presentation and after 1 month of oral atropine

Patient		1	2	3	4	mean	SD
Pyloric thickness (mm)	At presentation	5	4	4.4	5.6	4.75	0.60
	After 1 month	3.3	3	3.3	2.8	3.1	0.21
Pyloric canal length (mm)	At presentation	15	20	22	22	19.75	2.86
	After 1 month	12	13	15	16	14	1.58

Results

Table 1 shows the study group consisted of two males and two females with mean weight of 2.43kg (SD 0.27) and mean age of presentation of 28 days (SD 5). The mean duration for intravenous atropine given to all four patients was 5.8 days (SD 1.5) followed by oral atropine for 1 month. The mean length of hospital stay seen was 12.5 days (SD 2). Subsequent mean weight gain after 1 month of oral atropine was 717grams (SD 154).

Table 2 shows ultrasonography findings with mean pyloric muscle thickness at presentation as 4.75mm (SD 0.6. This significantly reduced to mean of 3.1 mm (SD 0.21) after 1 month of oral atropine in our study. Also, the mean pyloric length at presentation was 19.75mm (SD 2.86). This significantly reduced to 14 mm (SD 1.58). All 4 patients were successfully treated with atropine. None of the patients had significant vomiting. There was no evidence of tachycardia, facial flushing or any elevated alanine transferase activity noted. Vomiting subsided in all four patients and there was documented adequate weight gain.

Discussion

Atropine sulfate is a cholinergic drug with strong antimuscarinic effects. It temporarily decreases spastic contractions of pyloric muscle in pyloric stenosis (4). The clusters of tonic and phasic contractions, typical of IHPS are transiently abolished by an intravenous atropine injection of 0.01mg/kg (4). This effective dose of atropine used in our study was reported by Kawahara and determined by manometric findings in patients of IHPS (4). Kawahara *et al* reported a success rate of 89% with this fixed dose regimen (5). Singh *et al* in 2001 reported a success rate of 96% with atropine (6). In our study all four of patients (100%) responded to this fixed dose regimen of intravenous atropine followed by oral atropine and showed substantial regression of pyloric canal length as well as pyloric muscle thickness.

Regression of pyloric muscle hypertrophy has been evaluated ultrasonographically in patients managed surgically and medically. Yamataka *et al* reported the normalization of pyloric muscle thickness did not significantly differ between patients treated medically with atropine (3.4 (mean 2.3) months) and those managed surgically by pyloromyotomy (3.8 (mean 2.0) months) (7).

Surgical correction of IHPS with pyloromyotomy is associated with complications like perforation of mucosa, wound infection, wound dehiscence and risk of anaesthesia. Hulka *et al* reported 0.1% mortality, 4% intraoperative and 6% postoperative complications (8). No such serious complications have been reported with atropine. Nagita *et al* reported mild facial flushing, increased alanine aminotransferase activity and tachycardia. (9). Kawahara reported that the period of hospitalization for patients treated surgically was significantly shorter (5 days [4-29]) than those treated with atropine (13 days [6-36]) (10). Patients in our study had also similar period of stay of 12 days. However, those managed with atropine have to continue oral atropine after being discharged home for about 1 month. This long duration of medical treatment can be acceptable in order to avoid the risks associated with surgery and anesthesia.

Conclusion

Although pyloromyotomy is the standard treatment of IHPS, the possible risks of surgery cannot be ignored. Also an expert pediatric surgeon is not universally available, especially at rural health centers, as happened in our cases. There can be a role of medical management of IHPS in situations such as contraindications to surgery, unavailability of pediatric surgeon and parental choice of non-surgical modality.

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