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COMPARISON BETWEEN MEDICAL AND SURGICAL MANAGEMENT OF INFANTILE HYPERTROPHIC PYLORIC STENOSIS

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ABSTRACT

Introduction- Infantile hypertrophic pyloric stenosis (IHPS) is the most common cause of non-bilious vomiting in infants. Ramstedt pyloromyotomy has been regarded as the optimal treatment for infantile hypertrophic pyloric stenosis. Medical treatment with atropine sulphate has been proposed as an alternative to surgical treatment. There have been reports of varying success rate of medical management of IHPS with atropine.

Aim-The objective of this study was to compare medical and surgical treatment of IHPS for success rate, efficacy and complications.

Methods-Retrospective data of four patients of IHPS treated with atropine was compared with six patients of IHPS surgically managed.

Results- Our study showed medical management was very much successful as standard surgical management of IHPS. It was not associated with any complication.

Conclusion-There can be a definite role of medical management of IHPS in situations such as contraindications to surgery, unavailability of paediatric surgeon and parental choice of non-surgical modality.

Introduction

Infantile hypertrophic pyloric stenosis (IHPS) is the most common cause of non-bilious vomiting in infants and has been the most common cause of gastric outlet obstruction in infancy (1). It presents as one of the most common surgical conditions of infancy (2). Its incidence is 1 to 3 per 1000 live births with 4:1 male-to-female ratio (3).

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.Two theories have been mentioned in literature the most: absence of non-adrenergic and non-cholinergic nerve fibres which are mediators of smooth muscle contraction, and absence of nitric oxide inhibitory innervation of pyloric smooth-muscle resulting in unopposed contraction of the sphincter in response to muscarinic stimulation.

The diagnosis of IHPS can be made on a history of non-bilious vomiting and by palpation of the hypertrophied pylorus, or 'olive'. Both together have a positive predictive value of 99% (4). This is confirmed on ultrasonography.

Fredet-Ramstedt pyloromyotomy has been regarded as the optimal treatment for infantile hypertrophic pyloric stenosis (5). Medical treatment with atropine sulphate has been proposed as an alternative to surgical treatment. Atropine sulphate is a cholinergic drug with strong anti-muscarinic effects, which temporarily suppresses spastic contractions of pyloric muscle in pyloric stenosis (6). The clusters of tonic and phasic pyloric contractions characteristic of IHPS are transiently abolished by atropine. There have been reports of varying success rate of medical management of IHPS with atropine.

Aim –

The objective of this study was to compare medical and surgical treatment of IHPS for success rate, efficacy and complications.

Methods-

The medical management of IHPS was conducted at a medical college where first author worked 3 years back. This institute had no paediatric surgeon. Study population here consisted of 4 patients of IHPS and parents refusing surgery. They were treated with atropine. This retrospective data of medically managed IHPS patients was used for comparison with surgically managed patients at the second institute where the first author now works. Retrospective data of 6 patients admitted for IHPS and treated surgically by pyloromyotomy was collected from the files in the second institute. Comparative data so obtained was analysed.

Both the group of patients (Group 1-Medically managed and Group 2- Surgically managed) fulfilled the following diagnostic criteria for IHPS:

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

Group 1- Medical managed with atropine

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 hourly. 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. Monitoring notes in files were recorded. On discharge, patients were continued on oral atropine for 1 month at the same dose.

Group 2- Surgically managed

Treatment in this group began with correction of dehydration and electrolyte imbalance with appropriate fluids. Surgical treatment consisted of classical Ramstedt's pyloromyotomy under general anaesthesia. Oral feeding with milk was allowed after 48 hours of surgery and assessing bowel sounds. They were kept hospitalized until full feeds were tolerated for 2 days without vomiting. Monitoring and complication notes in files were recorded.

Table 1- Clinical profile of Group 1 patients-

	1	2	3	4	Mean	SD
Sex	male	female	male	female	-------	-------
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 4 weeks of oral atropine (grams)	500	650	900	820	717	154

Table 2-Clinical profile of Group 2 patients-

	1	2	3	4	5	6	Mean	SD
Sex	male	male	male	female	male	male	------	------
Age of Presentation (days)	23	30	25	28	22	27	25.8	3.06
Weight at presentation (Kgs)	2.150	2.350	2.650	2.540	2.240	2.250	2.360	0.19
Period of hospitalization (days)	7	8	7	7	14	8	8.5	2.73
Weight gain after 4 weeks of discharge (grams)	700	800	850	730	650	720	741.6	71.94

Table 3-Ultrasonography findings –

		1	2	3	4	5	6	Mean	SD
Pyloric thickness (mm)	Group1	5	4	4.4	5.6	----	----	4.75	0.60
	Group2	4.5	5	5	4.6	5.5	4.5	4.85	0.39
Pyloric canal length (mm)	Group1	15	20	22	22	----	----	19.75	2.86
	Group2	16	22	20	18	22	18	19.33	2.42

Results-

Table 1 shows group 1 consisted of two males and two females with mean weight of 2.43 kg (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).

Table 2 shows group 2 consisted of five males and one female with mean weight of 2.36 kg and mean age of presentation of 25 days. The mean length of hospital stay in surgically managed patients was 8.5 days which was 4 days less than medically managed patients.

Table 3 shows ultrasonography findings with mean pyloric muscle thickness at presentation in group 1 was 4.75mm and group 2 was 4.85mm. Also, the mean pyloric length at presentation in group 1 was 19.75mm and group 2 was 19.33mm.

There was no evidence of tachycardia, facial flushing or any elevated alanine transferase activity noted in group 1. Vomiting subsided in all four patients of this group and there was documented adequate weight. Group 1 had no complications. In group 2 however one patient had wound infection, which prolonged his hospital stay. Vomiting subsided in all of group 2 patients and they also had documented weight gain.

Discussion

Atropine sulphate is a cholinergic drug with strong ant-muscarinic effects. It temporarily decreases spastic contractions of pyloric muscle in pyloric stenosis (7). The clusters of tonic and phasic contractions, typical of IHPS are transiently abolished by an intravenous atropine injection of 0.01mg/kg (7). This effective dose of atropine used in the first group was reported by Kawahara and determined by manometric findings in patients of IHPS (7). Kawahara et al reported a success rate of 89% with this fixed dose regimen (8). Singh et al reported a success rate of 96% with atropine (9). 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) (10). 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 complications and 6% postoperative complications, such as bleeding, mucosal perforation and wound infection (11). Mucosal perforation commonly occurs as a result of extension of myotomy beyond the pyloric–duodenal junction. Pranikoff et al. found that the risk for mucosal perforation was 0.5% when pyloromyotomy was performed by a paediatric surgeon (12). Our study showed one patient developed wound infection in group 2.

No such serious complications have been reported with atropine. Nagita et al reported mild facial flushing, increased alanine aminotransferase activity and tachycardia. (13).Our study did not report any complications in group 1. 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]) (14). Our study showed mean duration of hospital stay in surgical group was 8.5 days as opposed to 12.5 days in those treated with atropine. However, those managed with atropine had 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 anaesthesia.

Surgical treatment has been clearly superior to medical treatment with regard to response and also associated with a shorter hospital stay. Complications, however, occurred more often in the surgically treated group. Although pyloromyotomy is a safe curative procedure, it has its risks. Although the complication rate in the surgical group was higher than that in the medical group in this study, the difference was not statistically significant. Other concerns with atropine treatment are the length of hospital stay and the necessity to continue oral atropine medication after being discharged home, which requires good compliance by the parents. The success rate for the patients treated with atropine was reported by Singh et al. and Kasuko et al. was 96%.(9,15). Kawahara reported it as 87% (14). Our study reported 100% success rate in patients treated with atropine. However number of patients treated with atropine in our study were less.

Conclusion

Although pyloromyotomy is the standard treatment of IHPS, the possible risks of surgery cannot be ignored. The success rate of medical treatment with atropine nevertheless justifies its administration to infants in whom surgery is contraindicated. The medical management of IHPS is rarely associated with any significant complication. Hence there can be a definite role of medical management of IHPS in situations such as

contraindications to surgery, unavailability of paediatric surgeon and parental choice of non-surgical modality.

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