
**INFANTILE HYPERTROPHIC PYLORIC STENOSIS:
POSTOPERATIVE MANAGEMENT WITHOUT
PROLONGED FASTING OR NASOGASTRIC TUBE****Abbas Abdulzahra Alhassani**

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Abstract

Infantile hypertrophic pyloric stenosis is the most common condition requiring surgery in the first few months of life and also the most common surgical cause of vomiting in infancy.

All pediatric surgeons agreed that Ramstad's operation (pyloric sero-myotomy) is the standard choice of surgical correction, however, the perioperative management is controversial, specially that is related to and recommended for the time of resumption of feeding postoperatively.

The present work is prospective comparative study reviews 55 infants diagnosed as having hypertrophic pyloric stenosis over a 2 years period and subjected to pyloromyotomy. Postoperatively, 22 (40%) patients managed without the use of nasogastric tube and early introduction of oral feeding. The remaining 33 (60%) patients were managed classically with nasogastric tube decompression and delayed introduction of oral feeding until the next morning. This study was designed to compare between the two groups and to verify if there will be any significant effect on the postoperative course.

Statistical analysis of the postoperative incidence of vomiting, postoperative complications, and hospital stay showed that there were no significant differences between the two groups of patients. Therefore, non-use of postoperative nasogastric tube and early feeding are safe postoperative approach in the management of infantile hypertrophic stenosis and may be the preferred method of postoperative management.

Introduction

Infantile hypertrophic pyloric stenosis (IHPS) is a common pediatric surgical entity that affects 2.5–3% of live births¹⁻³. The incidence is approximately three cases per 1000 births. It is the most common surgical cause of vomiting in infancy and at the same time, the most common condition requiring surgery in the first few months of life¹.

The pyloric canal of the affected infant is narrowed and elongated due to circular smooth muscle hypertrophy resulting in a sort of gastric outlet stenosis that is progressive and in turn causes projectile non-bilious vomiting, dehydration and electrolytes disturbances.

In 1908 Fredet advocated "longitudinal submucosal division of the thickened pyloric muscle", but recommended suturing the defect transversely. In 1921 Wilhelm Conard Ramstedt (1867-1963), a

surgeon at Rafael Clinic, Munster, Germany⁴ simplified the Fredet procedure by omitting the transverse suturing, leaving the mucosa exposed in the longitudinal sero-muscular defect; this operation was successful and its essential elements have remained virtually unmodified. Surgery has now completely replaced medical measures for treatment of IHPS.

All pediatric surgeons now are agreed that Ramstedt's operation is the standard choice of surgical correction, however, the perioperative management is controversial, and especially that is related to recommended time of postoperative feeding resumption.

The aim of this work is to study the omitting of routine nasogastric tube usage in postoperative period and to show the impact of early feeding on the incidence

of postoperative vomiting and patient hospitalization.

Patients and method

This is a prospective comparative study done in pediatric surgical center in Al Basrah pediatric and gynecology hospital, involving patients managed for infantile hypertrophic pyloric stenosis over 2 years extending from January 2008 to January 2010.

Demographic and clinical information were collected in current study including age, sex, residency, duration of symptoms, mode of feeding, and the investigations used for diagnosis.

The total number of patients was 55. They were randomly divided into 2 groups according to the post-operative management.

Group (A) (22 patients, 40%) was managed post-operatively by omitting the routine use of nasogastric tube and early start of oral feeding consisting of Dextrose water 5% after 6 hours and gradual introduction of milk (resumption of what was already used for the individual patient whether breast milk, bottle feeding or mixed feeding) to reach full feeding after 24 hours i.e. to offer 2 onuses of milk every 2 hours. Group (B) (33 patients, 60%) was managed by routine use of

nasogastric tube that was placed preoperatively and nil per ors until the next morning when nasogastric tube was removed followed by gradual introduction of oral feeding starting with Dextrose water 5% followed by milk as mentioned above.

Both groups were studied for post-operative incidence of vomiting, other post-operative complications and post-operative length of hospital stay.

Results

Table (I) shows the socio-demographic characteristics of the study group. The mean age for the group A was 45.1 ± 18.1 days, while for group B was 40.2 ± 12.6 days. The majority of infants were aged 4-8 weeks, and they constitute 54.5% of the studied infants (no.=30).

50 infants were males (91%) and only 5 were females (9%) with 1:10 female to male ratio. The majority of patients were from Basrah (both city center and peripheries) and only 14 patients (25.5%) were from other governorates (Thee Qar and Maysan).

There was no significant statistical differences between the two study groups regarding age, sex, address and feeding type (P-value > 0.05).

Table I: Demographic characteristics of the study groups

Demographic characteristics	Group A (n=22)		Group B (n=33)		Total (n=55)		P-value	
	No.	%	No.	%	No.	%		
Age	< 4 weeks	4	18.2	8	24.24	12	21.82	0.807
	4-8 weeks	12	54.5	18	54.54	30	54.55	
	> 8 weeks	6	27.3	7	21.22	13	23.63	
						55	100	
Sex	Males	20	90.9	30	90.9	50	90.9	P-value NS*
	Females	2	9.1	3	9.1	5	9.1	
						55	100	
Address	City center	6	27.2	7	21.2	13	23.6	0.178
	Peripheries	8	36.4	20	60.6	28	50.9	
	Others**	8	36.4	6	18.2	14	25.5	
						55	100	
Feeding	Breast	18	81.8	25	75.7	43	78.2	0.795
	Bottle	1	4.5	3	9.1	4	7.3	
	Mixed	3	13.7	5	15.2	8	14.5	

*Fisher exact test. **Others=other governorates.

All patients presented initially with history of repeated vomiting. Dehydration was noticed clinically in 45 patients (81.8%), visible peristalsis seen in 28 patients (50.9%), while a palpable mass in the right upper abdominal quarter felt in 32 patients (58.2%). Symptoms were lasting for up to 14 days in 32 patients (58.2%), 2-4 weeks in 7 patients (12.7%) and for more than 4 weeks in 16 patients

(29.1%). Ultrasound scan used in confirmation of the diagnosis in 35 patients (63.6%), while barium meal used in 20 patients (36.4%).

After surgical correction, the incidence of postoperative vomiting was studied and is shown on Table (II). There was no significant statistical difference between the two groups (P-value= 0.129).

Table II: Postoperative vomiting of the study groups

	Group A (n=22)		Group B (n=33)		Total (n=55)	
	No.	%	No.	%	No.	%
< 3 times	14	63.6	27	81.7	41	74.5
> 3 times	8	36.4	6	18.3	14	25.5
Total	22	100.0	33	100.0	55	100.0

Chi-square= 2.299 df=1 P-value= 0.129

Postoperative complications (wound infection, intra-abdominal bleeding and postoperative chest infection) were shown in Table (III). There was no significant

statistical difference between the two study groups regarding these parameters (P-value =1).

Table III: Postoperative complications in study groups

Complications	Group A (n=22)		Group B (n=33)	
	No.	%	No.	%
Wound infection	1	4.5	0	0.0
Intra-abdominal Hg.	0	0.0	1	3.0
Chest infection	1	4.5	2	6.0
Complications (Total)	2	9.1	3	9.1
No Complications	20	90.9	30	90.9
Total	22	100.0	33	100.0

Then, postoperative hospitalization period was studied. Patients were divided into 3 groups, hospitalization that last for less than 48 hours, 48 to 72 hours, and those who were hospitalized for more than 72

hours. Table (IV) shows no significant statistically differences in the hospitalization periods between group A and group B (P-value = 0.152).

Table IV: Postoperative hospitalization of the study groups

Hospital stay (hrs.)	Group A (n=22)		Group B (n=33)		Total (n=55)	
	No.	%	No.	%	No.	%
< 48	7	31.8	6	18.2	13	23.6
48-72	12	54.5	15	45.5	27	49.1
> 72	3	13.7	12	36.3	15	27.3
Total	22	100.0	33	100.0	55	100.0

Chi-square= 3.76

df= 2 P-value= 0.152

Discussion

Infantile hypertrophic pyloric stenosis is an important pediatric surgical problem as it represents one of the most common indications for surgical intervention early in life, and due to poor results of conservative approaches.

This study is trying to investigate some postoperative routine measures that stayed for many years as gold standards in the management of this disease condition, so it was designed to find out any correlation between two different postoperative care modalities.

Surgeon can depend on typical history information and abdominal examination to palpate the hypertrophied pylorus, the pyloric olive, to make a sound diagnosis. This is followed logically by a confirmation usually by the use of abdominal ultrasound scan that is highly specific and sensitive⁵. It was reported in the current study that abdominal ultrasound scan was inconclusive in 20 patients (36.4%) and this may be attributed by the fact that ultrasound is an operator dependent, so Barium meal was used to confirm the diagnosis.

There were 2 case control studies described an increase incidence of infantile hypertrophic pyloric stenosis in bottle-fed infants to about two to three folds, this raise the discussion about the protective role of breast feeding against this pediatric surgical condition^{6,7}. This study reported that 43(78.2%) were breast-fed, while 12 patients (21.8%) were bottle fed either exclusively or mixed with

breast feeding. So the protective role of the breast feeding in our area needs to be further studied.

After ensuring that there were no significant differences in the baseline criteria between study groups, this study showed that postoperative vomiting and length of hospital stay reported in both study groups whether nasogastric tube was used or not were not significantly differ (P-value=0.129 and 0.152 respectively), the same finding was seen by Flageole HH and Pemberton J, who had a randomized controlled trial done between January 2010 and June 2012, in which he investigated the impact of preoperative nasogastric tubes on postoperative incidence of vomiting and postoperative hospitalization period, and concluded that "the use of nasogastric tube in the perioperative period had no demonstrable effect on postoperative emesis or hospitalization period"⁸.

Several studies concentrating on the postoperative feeding regimens, some are suggesting early feeding after surgery (less than or equal to 6 hours)^{9,10}, while many other studies have recommended a longer period of starvation^{11,12}. In this study, no significant statistical difference in the incidence of postoperative emesis whether feeding was initiated 6 hours after surgery (early feeding) or delayed to the next morning (delayed feeding). This was consistent with what was seen by Wheeler RA, et al¹³ and Gollin G, et al¹⁴. this study does not agreed with some researches

which suggested that early feeding could cause significant increase in the postoperative vomiting, examples for these studies are what was reported by Lee AC, Munro FD, MacKinlay GA¹⁵ and Georgeson KE, et al¹⁶.

Nasogastric tube has well-known complications (at its insertion, while in its place and at time of removal), this study supports a post-pyloromyotomy care without nasogastric tube, this measure has

two more advantages, the first is manage the affected child without the use of annoying tube that cause much discomfort for the patient and his or her parents, besides that, the economic benefit is so clear. The same is true for early resumption of oral feeding after surgery.

So, it is a safe postoperative approach in the management of infantile hypertrophic stenosis.

References

1. Brain F, Gilchrist. Lesions of the stomach. *Pediatric Surgery* 2005; 29: 405-414.
2. Kathy Jane Helton, Janet L. Strife, Brad W. Warner, Terri L. Byczkowski, Edward F. Donovan. The impact of a clinical guideline on imaging children with hypertrophic pyloric stenosis. *PediatrRadiol* (2004) 34: 733–736.
3. Michael S Irish et al. Pediatric Hypertrophic Pyloric Stenosis Surgery: eMedicine from WebMD, website: Copyright © 1994-2015 by WebMD LLC. <http://emedicine.medscape.com/article/937263-overview>
4. John N. Primrose. *Short Practice of Surgery* (2004) 62: 1033.
5. Boneti C, McVay MR, Kokoska ER, et al.: Ultrasound as a diagnostic tool used by surgeon in pyloric stenosis. *J Pediatr Surg.* 43:87-91, 2008.
6. Habbick BF, Khanna C, To T.. Infantile hypertrophic pyloric stenosis: a study of feeding practices and other possible causes. *CMAJ.* 1989;140(4):401–404
7. Pisacane A, de Luca U, Criscuolo L, et al. . Breast feeding and hypertrophic pyloric stenosis: population based case-control study. *BMJ.* 1996;312(7033):745–746
8. Flageole HH and Pemberton J. Post-Operative Impact of Nasogastric Tubes on length of stay in infants with pyloric Stenosis (POINTS): A prospective randomized controlled pilot trial: *J Pediatr Surg.* 2015 Feb 19. pii: S0022-3468(15)00103-7.
9. Puapong D, et al. Ad libitum feeding: safely improving the costeffectiveness of pyloromyotomy. *J Pediatr Surg.* Dec. 2002 Volume 37, Issue 12, Pages 1667–1668
10. Adibe OO, et al. Ad libitum feeds after laparoscopic pyloromyotomy: a retrospective comparison with a standardized feeding regimen in 227 infants. *J Laparoendosc Adv Surg Tech A* 2007;17(2):235-7.
11. Van der Bilt JD, et al. Early feeding after laparoscopic pyloromyotomy:the pros and cons. *Surg Endosc* 2004;18(5):746-8.
12. Turnock RR, Rangescroft L. Comparison of postpyloromyotomy feeding regimens in infantile hypertrophic pyloric stenosis. *J R CollSurg Edinb* 1991;36(3):164-5.
13. Wheeler RA, et al. Feeding regimens after pyloromyotomy. *Br J Surg*1990;77(9):1018-9.
14. Gollin G, et al. Rapid advancement of feedings after pyloromyotomy for pyloric stenosis. *Clin Pediatr (Phila)* 2000;39(3):187-90.
15. Lee AC, Munro FD, MacKinlay GA. An audit of post pyloromyotomyfeeding regimens. *Eur J Pediatr Surg* 2001;11(1):12-4
16. Georgeson KE, et al. An analysis of feeding regimens afterpyloromyotomy for hypertrophic pyloric stenosis. *J Pediatr Surg* 1993;28(11):1478-80.