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Is there any correlation between radiologic findings and eradication of symptoms after pyloromyotomy in hypertrophic pyloric stenosis?

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ABSTRACT

Background: Hypertrophic pyloric stenosis (HPS) is one of the most common gastrointestinal disorders during early infancy, with an incidence of 1-2:1000 live births in the world. In this study, we aimed to investigate the correlation between radiologic findings and eradication of symptoms after pyloromyotomy in HPS. **Materials and Methods:** One hundred and twenty-five (102 boys and 23 girls) patients with suspected infantile HPS were treated surgically by Ramstedt pyloromyotomy between March 21, 2004 and March 20, 2014 at paediatric surgery ward of Tabriz Children's Hospital, Iran. The demographic features, clinical findings, diagnostic work-up, operation type and postoperative specifications of the patients were studied retrospectively. **Results:** Male to female ratio was 4:1. The patients were 16-90 days of old and the mean age was 39 ± 1.42 days. The range of pyloric canal length was 7.60-29.00 mm and the mean length was 19.54 ± 3.42 mm. Pyloric muscle diameter was 2.70-9.00 mm, and the mean diameter was 4.86 ± 1.14 mm. Seventy-two percent of patients had episodes of vomiting after operation. Mean time of persistence of vomiting after pyloromyotomy was 15.73 ± 0.15 h. Mean discharge time was 55.22 ± 0.08 h. Radiologic findings did not show any significant correlation with persistence of vomiting or discharge time. **Conclusion:** The present study revealed that radiographic findings could not predict postoperative symptom eradication after pyloromyotomy in HPS.

Key words: Hypertrophic pyloric stenosis, pyloromyotomy, vomiting

INTRODUCTION

Infantile hypertrophic pyloric stenosis (HPS) is a condition in which the antropyloric portion of the stomach becomes abnormally thickened, resulting in obstruction to gastric emptying. HPS occurs in patients aged 2-10 weeks and is the most common surgical condition in infants,[1] with a frequency of approximately 1-2 cases per thousand births.[2] Despite the frequency of this condition, it was not recognised until the late 19th century when the detailed description of two fatal cases was reported by Hirschsprung in 1887 and published 1-year later.[3] It has been shown that HPS occurs much more frequently in males than in females.[2,4-8] The incidence rate in Caucasians is higher than that in Asians.[2,9-12] The aetiology of HPS is still unclear, undoubtedly includes environmental and genetic components.[13,14] The typical clinical presentation is projectile, nonbilious vomiting occurring at the age of 2-8 weeks,[2,15] and usually occurring 10-30 min after feeding. Although medical diagnosis can be done by palpable olive-shaped mass in the right upper quadrant, abdominal ultrasonography and barium studies are necessary to establish the diagnosis.[16] In this study, we aimed to investigate the correlation between radiologic findings and symptoms eradication after pyloromyotomy in HPS patients.

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MATERIALS AND METHODS

We retrospectively studied 124 patients from March 21, 2004 to March 20, 2014. The infant patients had confirmed diagnosis of HPS and underwent pyloromyotomy at Children's Hospital of Tabriz, Iran.

We excluded premature infants as well as infants with febrile or septic conditions. Patients with bilious vomiting were also excluded. There were 101 boys and 23 girls, at median age of 35 days (range: 16-90 days) in the study patients. The diagnosis was initially established by either an ultrasound or by barium meals together with clinical findings followed by intraoperative confirmation. Open pyloromyotomy was performed once the patient was adequately resuscitated, and the associated metabolic derangements were corrected. Feeding was started classically 6 h postoperatively and advanced gradually according to patients' tolerance. Patients were discharged once they tolerated full enteral feeding without vomiting.

Demographic features, clinical findings, diagnostic work-up, type of operation and postoperative findings were recorded for the study patients. Ultrasonographic findings were recorded for the study patients. These included pyloric canal length (PCL) and pyloric muscle diameter (PMD). These values were calculated in the millimetre scale. Postoperative persistence of vomiting was calculated in hours and days of postoperative admission to discharge were recorded in days. The Pearson correlation coefficient was used for comparative analysis of continuous variables.

RESULTS

During the study period, we had 125 patients (102 boys, 23 girls) with confirmed diagnosis of HPS who admitted to the Children's Hospital of Tabriz, Iran. The male:female ratio was 4.43:1, and the median and mean standard deviation age at presentation were 35 (1.90) and 39.06 (1.42) days. According to ultrasound findings of patients, the range of PLC was between 7.60 and 29.00 mm and the mean of this parameter was 19.54 ± 0.324 mm. PMD was between 2.70 and 9.00 mm, and the mean of this parameter was 4.86 ± 0.108 mm.

Among the study patients, 90 patients had episodes of postoperative vomiting. Table 1 illustrates PLC, PMD and duration of postoperative vomiting and admission in the study patients. Plain abdominal radiography was done in 30 patients while 14 patients had barium swallow [Table 1].

PCL and PMD did not have any significant correlation with the time to vomiting persistence after pyloromyotomy ($P = 0.735$ and $P = 0.812$ respectively). The correlations with the duration of hospitalisation were also insignificant ($P = 0.814$ and $P = 0.930$ respectively).

DISCUSSION

Definitely, it would be useful to determine which patients can tolerate feedings and discharge early after pyloromyotomy and which patients cannot, so as to benefit from the significant cost savings and improved use of hospital beds and appropriate and effective service that result from early discharge and yet prevent emergency department visits and readmission for some patients and anxiety for their parents. Previous studies have shown little change in postoperative admission time on the basis of feeding regimen. Early feeding (<4 h) after pyloromyotomy has not decreased the time to full feedings or the duration of postoperative hospitalisation.[17] Furthermore, *ad libitum* feedings also had little effect on time to full feedings and to discharge.[18-20] The most recent change in the treatment of pyloromyotomy has been the adoption of laparoscopic pyloromyotomy. A recent multi-institution, prospective, randomised trial by Garza *et al*.[20] showed that the time to both full feedings and discharge was reduced by 10 h with the laparoscopic technique. However, in that study, the time to deliberate feedings was still 18.5 h, and the duration of hospitalisation after surgery was 33.6 h. Furthermore, two other prospective studies showed that the time to full feedings and the time to discharge were similar between the laparoscopic and open

Table 1: Characteristics of the study patients

Gender	Age		Admission weight		PCL		PMD		Vomiting persistence after pyloromyotomy		Discharge time after pyloromyotomy	
	n	Mean ± SD	*n*	Mean ± SD	*n*	Mean ± SD	*n*	Mean ± SD	*n*	Mean ± SD	*n*	Mean ± SD
Male	102	39.10±1.49	102	3851.14±77.36	92	19.67±0.37	110	4.86±0.11	101	15.85±2.04	100	55.20±2.47
Female	23	38.80±4.08	23	3538.70±548.96	19	18.92±0.56	21	4.91±0.33	23	15.17±1.97	23	55.30±4.11

n: Number; SD: Standard deviation; PCL: Pyloric canal length; PMD: Pyloric muscle diameter

techniques.[21,22] Predicting early discharge on the basis of the pyloromyotomy technique is thus not feasible.

Because previous studies found no effect from factors not associated with the patients themselves, we sought correlations between patient-specific radiological factors such as pyloric length (mm) and pyloric width (mm) and vomiting persistence after pyloromyotomy and duration of hospitalisation. In our study, we found pylorus size had no effect on persistent of vomiting after surgery and postoperative length of stay. Our study had multiple limitations. First, it was a retrospective study. Several different surgeons performed the pyloromyotomies, and the specific techniques used were based on each surgeon's preference. During the study period, the minimally invasive approach had just begun to be implemented, accounting for the low number of laparoscopic pyloromyotomies. However, we do not believe that the use of different techniques would have a major effect on recovery, as shown by multiple previous studies.[21-23] Another limitation of our study was that the postoperative feeding regimen was not standardised although previous studies have not shown any association between different regimens and postoperative conditions of the patients.[17-19] Patients had to be tolerating full feedings before discharge. Finally, only slightly more than 70% of the patients in our study were discharged within 24 h. Because of these results, we believe that until a prospective study confirms these findings, patients should remain hospitalised until they tolerate full feedings after pyloromyotomy.

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Conflicts of interest
There are no conflicts of interest.

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