Congenital (Infantile) Hypertrophic Pyloric Stenosis (IHPS)

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ABSTRACT

Background: Infantile hypertrophic pyloric stenosis affects 0.5 – 3.0 per 1000 live birth and it is the most common surgical cause of vomiting in infancy.

Objective: To analyze variable peri-natal factors that may be involved in the etiology of infantile hypertrophic pyloric stenosis.

Methods: Over a two year's period, from January 2000 – December 2001, 31 cases of infantile hypertrophic pyloric stenosis were evaluated for variable peri-natal risk factors in AL-Eskan central child teaching hospital for children.

Results: The 31 cases studied were 77.4% males and 48.4% at three weeks of age. And of all cases, 51.6% were breast fed with a blood group (O) being the predominant in 54.8%. Normal vaginal delivery was in 80.6% of cases. All infants 100% had vomiting, and 48.4% of them presented with Jaundice and only 16.1% had constipation. There were no significant correlations between age and pyloric mass size, age and presence of jaundice or between pyloric mass size and the presence of jaundice.

Conclusion: Infantile hypertrophic pyloric stenosis is a common condition affecting young infants and its etiology remains unknown, more genetic and environmental factors should be investigated in the future.

Key Words: Infantile hypertrophic pyloric stenosis, congenital pyloric stenosis, pyloric stenosis.

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Introduction

In 1717, Blair first reported autopsy findings of pyloric stenosis [(1)]. Hirschsprung wrote the first complete description of hypertrophic pyloric stenosis in 1888, he believed that the disease was congenital and represents fetal pyloric development failure [(2)].

Avival L *et al.* 2003 reported that there was no conclusive evidence for the etiology of pyloric stenosis, however hereditary and environmental influences are also believed to contribute [(3)]. Abnormal muscle innervations were implicated, moreover elevated levels of prostaglandins, reduced levels of pyloric nitric oxide synthase and infant's hypergastrinemia have all been blamed[(4,5)].

Infantile hypertrophic pyloric stenosis (IHPS) affects 0.5 to 3.0 per 1000 live birth [(5,6)].

Traditionally, the diagnosis of IHPS is based on a history of projectile, non-bilious vomiting and by palpation of a pyloric tumor [(7,8)]. Infantile hypertrophic pyloric stenosis is the most common surgical cause of vomiting in infancy [(9)]

Methods

During a period extending from January 2000 – December 2001, 31 cases of IHPS were studied in the central child teaching hospital in Baghdad; only infants less than one year of age with confirmed IHPS at the time of surgery were included in this analysis.

Data included those related to infant (age, sex, and type of delivery, type of feeding, blood group, any associated congenital anomalies and signs and symptoms of presentation). Other data included 3rd trimester stress(maternal related physical, environmental or psychological factors), percentage of 1st baby affected, any history of pyloric stenosis in the father or mother, relation between age and mass size, relation between age and presence of Jaundice, relation between size of mass and presence of Jaundice. We included in our study the diagnostic tools used for diagnosis and seasonal variation of presentation.

Results

Regarding the age of infant at time of presentation, the highest presentation 48.4% was at 3 weeks of age**, Table-1**.

Regarding the sex distribution of IHPS, 77.4% were males and 22.6% were females, **Table- 2**.

Eighty point six percent of the infants were delivered by normal vaginal delivery and only 19.4% were by cesarean section, **Table- 3**.

Regarding the type of feeding, results show that 51.6% of infants were breast fed, 6.5% were artificially fed and 41.9% were on mixed feeding, **Table-4**. The blood groups of IHPS infants, with the highest percentage 54.8% was of blood group (O^{+ve}) and the lowest percentage 2.2% of (AB^{+ve}) blood group, **Table-5**.

In this study, no other congenital anomalies were found in all cases.

Regarding the signs and symptoms at presentation, all cases 100% had vomiting, and 48.4% had jaundice, while only 16.1% had constipation, **Table-6**.

The third trimester stress factors (maternal related physical, environmental or psychological factors) are present in 14 (45.2%) and absent in17 (54.8%) of mothers. We found that the first born baby was affected in 12 cases 38.7%, while the remaining 19 cases 61.3% were not the first born baby.

Regarding the history of IHPS, neither father nor mother had a history of IHPS in the present study the diagnostic tools used for diagnosis of IHPS**, Table-7**, of which 90.3% were diagnosed by ultrasound, 73.3% of 15 infants are diagnosed by barium meal and 61.3% of all cases are diagnosed by palpation.

There was no significant correlation between age and pyloric mass size (P value=0.401), between infant's age and presence of jaundice (P value=0.752) and between pyloric mass size and the presence of jaundice (P value=0.948).

Discussion

The typical infant of IHPS is 4 – 6 weeks of age, male, the first born child with non-bilious vomiting, becoming increasingly projectile, vomiting occurs over several days, to week[3,4,5,6]. This finding is in agreement with our finding of which 51.6% occur between 4 – 6 weeks.

We found that 51.6% of those infants were breast fed (41.9%) on mixed feeding and only (6.5%) were on artificial feeding.

While in other studies they found that pyloric stenosis has been variously associated with breast feeding and bottle feeding [10], so a further study is needed to stress on this association.

Regarding the type of delivery, a high percentage of pyloric stenosis was associated with normal vaginal delivery, which may be due to the fact that normal vaginal delivery is the predominant way of delivery.

In our study we found that a higher prevalence of pyloric stenosis associated with group O^{+ve} (54.8%), group A^{+ve} in 22.6% and group B^{+ve} in 19.4% while in other studies they found that pyloric stenosis is increased in infants with type B^{+ve} and O^{+ve} blood groups[7].

No associated congenital anomalies were found in all cases we studied, while it has been mentioned that pyloric stenosis is associated with other congenital defects including tracheo-oesophageal fistula, intestinal mal-rotation, obstructive defects of the urinary tract[7,12], and this finding may be related to the small number of cases in the study group.

It has been mentioned that the offspring of a mother (to a lesser extent father) with pyloric stenosis, are at higher risk for pyloric stenosis (pyloric stenosis develops in approximately 20% of the males and 10% of the females descendants of a mother who had pyloric stenosis) [7, 8, 11], in our study both the mother and father denied a history of pyloric stenosis.

In this study we found that there was no significant correlation between age and mass size (P value=0.401), between age and the presence of jaundice (P value=0.752) and between size of the mass and the presence of jaundice (P value = 0.948).

Jaundice associated with a decreased level of glucuronyl transferase is seen in approximately 5% of affected infants [7]. But our much higher percentage 48.4% may be due to the small sample size.

The diagnosis of IHPS can be established clinically in 60–80% of cases, by an experienced examiner [4,7], this was also found in our study.

Ultrasound examination confirms the diagnosis in the majority of cases and has a sensitivity of approximately 95%[4, 6, 7], this finding was in agreements with our results 90.3%, and therefore ultrasound examination is an efficient approach to establish the diagnosis of IHPS.

Barium studies were performed in 15 patients out of 31 and gave positive result in 73.3% of cases; this is in agreement with other study which have been done by Hulka F, *et al* [8].

About factors related to the mother, we found that mothers of infants with IHPS had stress in the third trimester in 45.2% of cases; therefore it seems that stress increases the risk of IHPS, this finding needs more studies in the future.

(Table 1) *Age of Infants at Presentation of Symptom*

Age/Weeks	*No. of Infants*	*%*
3	15	48.4
4	7	22.6
5	8	25.8
6	1	3.2
Total	31	100

(Table2) *The Demographic Distribution of PS in Relation to Sex*

Sex	*No*	*%*	*Mean*	*St. Deviation*	*St. Error of Mean*
Male	24	77.4	25.8909	7.9369	1.6550
Female	7	22.6	23.3257	5.1249	1.9370

*male/female ratio: 3.4: 1. P=0.430

(Table 3) *The Type of Delivery of IHPS Infants*

Type of Delivery	*no.*	*%*	*Mean*	*St. Deviation*	*St. Error of Mean*
NVD	25	80.6	25.6320	6.9389	1.3878
C/S	6	19.4	24.3550	9.2007	3.7562

P=0.706

(Table4) *The Type of Feeding of IHPS Infants*

Type of Feeding	*no.*	*%*	*Mean*	*St. Deviation*	*St. Error of Deviation*
Breast	16	51.6	26.7625	8.4369	2.1092
Artificial	2	6.5	20.1700	1.414 E	1.0000

*On mixed feeding

(Table5) *Blood Group of Infants Studied*

Blood Group	*no.*	*%*
O^{+ve}	17	54.8
A^{+ve}	7	22.6
B^{+ve}	6	19.4
AB^{+ve}	1	3.2
Total	31	100

P=0.073

(Table6) *Signs and Symptoms in Infants at Presentation*

Signs & Symptoms	*Present no. %*	*Absent no.%*	*Total no. %*
Vomiting	(100)31	0 (0)	31 (100)
Constipation	(16.1)5	26(83.9)	31 (100)
Jaundice	(48.4)15	16(51.6)	31 (100)

(Table7) *The Diagnostic Tools Used for Diagnosis of IHPS*

Tool Used	*Present no.%*		*Absent no.%*		*Total no. %*	
Palpation	19	(61.3)	12	(38.7)	31	(100)
Ultrasound	28	(90.3)	3	(9.7)	31	(100)
*Barium study	11	(73.3)	4	(26.7)	15	(100)

*16 patients are without barium study because barium was not available at that time.

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