Infantile hypertrophic pyloric stenosis: a single institution's experience

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Background/purpose **Infantile hypertrophic pyloric stenosis (IHPS) is said to be relatively common in the western world, but its incidence in the Kingdom of Saudi Arabia is unknown. We set out to study the incidence of IHPS in children presenting at our hospital and review the clinical presentation and treatment outcomes of such patients.**

Patients and methods **A retrospective chart review of all cases with IHPS admitted to a tertiary hospital, Riyadh Military Hospital, over 18 years (1990–2008) was conducted. Diagnosis was confirmed by ultrasonography according to the length of the pyloric channel and thickness of the pyloric muscles. An analysis of demographic data, clinical presentation, diagnostic modality, and associated congenital anomalies was carried out. Operative technique, postoperative course, and complication rates were identified.**

Results **The review of the medical records showed 22 patients with a diagnosis of IHPS. The incidence rate of IHPS was 1.4/10 000 live births. Demographically, most cases presented in the first month of life. It is more common in boys. In all, 55% of infants were first borns. Clinically, nonbilious projectile vomiting was the main symptom. Mild dehydration was found in half of the cases with alkalotic changes. Ultrasonography was the main diagnostic modality in 82% of cases. Others were diagnosed by contrast study. Open Ramstedt pyloromyotomy was the surgical approach in 20 (91%) cases and the laparoscopic approach in 2 cases (9%). Fourteen (14%) patients had an associated congenital inguinal hernia. The mean length of hospital stay was 5.5 days. The most common postoperative complication was wound infection in 4.5% of patients. Incidence of IHPS had obvious seasonal association.**

Conclusion **Incidence of IHPS at our hospital (the biggest hospital in the Kingdom of Saudi Arabia with an annual birth record of 14 000) is far less common than international incidences reported in North America and Europe. More reports from Saudi Arabia, the Middle East, and Asia are recommended to support the rarity of IHPS in this region of the world. Seasonal variation suggests a possible etiological role for environmental factors. It is of practical use for both epidemiologists and clinicians for future comparability.** ***Ann Pediatr Surg*** **8:39–41 © 2012 Annals of Pediatric Surgery.**

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Introduction

Infantile hypertrophic pyloric stenosis (IHPS) is an abnormal hypertrophy of the muscle at the pylorus that results in gastric outlet obstruction. However, its etiology is still unknown. The classic presentations of IHPS are projectile vomiting immediately after feeding and a palpable abdominal mass in the upper abdomen [1]. Since the advent of sonography, IHPS can be easily diagnosed and confirmed by abdominal sonography [2,3]. The fluoroscopic upper gastrointestinal tract study also plays a role in IHPS diagnosis [4]. Ramstedt pyloromyotomy is currently a standard modality of treatment for IHPS [5].

Among white individuals, pyloric stenosis is relatively common [6–11], with an incidence of 1.5–3/1000 live births [10,11]. Other than male sex [6,7,10–12], the most consistently reported risk factors for pyloric stenosis are a family history of pyloric stenosis [6,7,9,11,13] and being a first-born child [6,7,12,13]. Although the signs and symptoms of IHPS were described in the 17th century, the profile and pathology were not accurately described until 1888 (Jay L. Grosfeld, *Text Book of Pediatric Surgery*).

In the Kingdom of Saudi Arabia the incidence of IHPS is unknown. This study has been conducted to focus on the incidence of IHPS in children presenting at our hospital and to analyze other variables relating to the management of this disease compared with international standards.

Patients and methods

This was a retrospective study conducted by chart review. All cases of IHPS admitted to Riyadh Military Hospital over 18 years (1990–2008) were included in our study. The files were searched according to the international classification of diseases (ICD-9) coding of 750.5 for IHPS.

Medical records showed 22 patients with a diagnosis of IHPS. Diagnosis was confirmed by ultrasonography according to the length of the pyloric canal and thickness of the pyloric muscles.

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An analysis of demographic data, clinical presentation, diagnostic modality, and associated congenital anomalies was carried out. Operative technique, postoperative course, and complications were also analyzed.

Results

The review of medical records showed *22* patients diagnosed with IHPS who underwent pyloromyotomy. The male-to-female ratio for IHPS was 4 : 1. Out of *22* patients, 55% were first-born infants in a family and *22*.5% were second-born and third-born infants. The mean age at diagnosis was 30 days and 91% were products of full-term pregnancy. As shown in Table 1, incidence rate of IHPS was 1.4/10 000 live births for the years 1990–2008 in Riyadh Military Hospital [14]. This incidence has decreased significantly from 2.3/10 000 in the last decade to 0.7/10 000 at present, although the number of live births has increased.

The highest incidence was in the first quarter of the year. Forty-one percent of cases were reported during this period (January, February, and March). Of all IHPS cases, only three patients (14%) were identified with an associated congenital inguinal hernia. Eighteen patients (82%) were diagnosed by ultrasound and four patients (18%) required contrast study for diagnosis. The mean time from admission until surgical intervention was 3 days, which is needed to resuscitate and rehydrate infants. Surgical intervention (conventional Ramstedt pyloromyotomy) was carried out in 20 patients (91%) and laparoscopic surgery in two patients (9%). The mean time of starting feeding after surgery was 20 h and the hospital stay ranged from 4 to 14 days with a mean of 5.5 days. Prolonged admission for some patients was because of the fact that they were having associated congenital anomalies, which required another surgical intervention during the same admission.

Fifteen patients (68%) were admitted to the ward postoperatively; however, seven patients (*32*%) required admission to the pediatric ICU postoperatively, reflecting the low postoperative morbidity. Adequate resuscitation and electrolyte correction before surgery have reduced the number of cases that need to be admitted to the pediatric ICU. The most common postoperative complication was wound infection (4.5%).

Discussion

To our limited knowledge, the epidemiology of IHPS has never been investigated in Saudi Arabia. This study takes literature from a central hospital-based study measuring the incidence of IHPS in Riyadh Military Hospital and compares it with international reports. Local incidence of IHPS in Saudi Arabia is far less as shown in our study than in studies reported from North America and Europe (Sweden), which might reflect the effect of ethnic variations [15]. In our study, incidence of IHPS was found to be 0.14/1000 live births, which is lower than that reported in white populations [6–8,16–*22*]. One study in the US found a generally lower incidence in Asian populations of differing backgrounds such as Chinese (0.18/1000 live births), Vietnamese (0.44/1000 live births), Asian Indians (0.59/1000 live births), and Filipinos (0.43/1000 live births) compared with white populations [*22*]. The results of previous population-based cohort studies highly suggest that IHPS is a heritable disease with strong familial aggregation [23]. Therefore, the racial differences between IHPS incidence might be explained by genetic predisposition [23,24]. This incidence has decreased significantly from 0.23/1000 in the last decade to 0.07/1000 in the present, although the number of live births has increased.

Table 1 Incidence of infantile hypertrophic pyloric stenosis

Year	1990–1999	2000–2008	1990–2008
Number of cases	16	6	22
Number of live births	69 743	89 542	159 258
Incidence rate/10 000	2.3	0.7	1.4

Elevated male-to-female ratio of 4 : 1 is consistent with the ratio in other international studies [6–8,16–21]. The basis for this higher male susceptibility is unknown. As yet, no genetic evidence on the sex chromosome explaining male predominance in IHPS has been identified. The mean age of diagnosis of IHPS in our study was 30 days, compared with previous studies that found the mean to be approximately 40 days [*22*]. No statistically significant associations were found between IHPS and seasonal variations in previous studies [12], but in our study there is a seasonal trend with higher incidence (41%) in the first quarter of the year (January, February, and March) [25]. This annual periodicity might be linked to an infective causal theory of the disease at this time of the year.

Increased risk of IHPS is obviously seen in early birth rank (55% in the first order), which run together with the international figures [6,17,25]. The most common postoperative complication was wound infection in 4.5%, which is higher than that found in international reports [26].

Conclusion

Incidence of IHPS in our hospital (the biggest hospital in the Kingdom of Saudi Arabia with an annual birth record of 14 000) is far less common than international incidences reported in North America and Europe. More reports from Saudi Arabia, the Middle East, and Asia are recommended to support the rarity of IHPS in this region of the world. Seasonal variation suggests a possible etiological role for environmental factors. It is of practical use for both epidemiologists and clinicians for purposes of future comparability.

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Conflicts of interest

There are no conflicts of interest.

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