SEASONAL VARIATION AND CLINICAL MANIFESTATIONS OF HYPERTROPHIC PYLORIC STENOSIS: A RETROSPECTIVE STUDY

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ABSTRACT

Hypertrophic pyloric stenosis (HPS) is a gastrointestinal condition that affects newborns and young infants and is characterized by progressive, non-bilious projectile vomiting. This study aimed to investigate the demographics and clinical manifestations of HPS. A retrospective, non-randomized study was conducted over a period of three years (2019-2022) and included 29 patients diagnosed with HPS at the Pediatric Clinic of the County Clinical Emergency Hospital of Constanta. The results showed a significant male predilection, with a ratio of 1:4.8, and a seasonal variation with a higher incidence of HPS in the summer months. The primary symptom of HPS was non-bilious forceful vomiting after feeding, observed in nearly all cases. Other symptoms included dehydration, stagnation and decrease in weight. The thickness of the pyloric muscle was measured using ultrasonography and was found to be an average of 54.5 mm, with a range between 30 mm and 79 mm, which is considered a strong indication of HPS. This study highlights the importance of considering HPS as a possible diagnosis in newborns and young infants presenting with symptoms of projectile vomiting, and emphasizes the need for further research into the seasonal variation of HPS and its underlying causes.

Keywords: hypertrophic pyloric stenosis, symptomatology, seasonal variation

Introduction

Hypertrophic pyloric stenosis (HPS) is a gastrointestinal condition affecting newborns and young infants characterized clinically by progressive non-bilious “projectile” vomiting (1). Usually, these children are born without symptoms, they appear later, in the first weeks of life. SHP inhibits the movement of stomach contents through the pyloric canal into the duodenum, which causes inadequate digestion of food and, as a result, the accumulation of gastric contents (2).

HPS is not a surgical emergency as it first requires aggressive intravenous resuscitation in dehydrated and metabolically unbalanced infants (3). After liquid correction, extramucous pyloromyotomy is the standard method of treatment, which is a surgical procedure that has remained relatively unchanged for over a century (4).

In children who experience vomiting, physical examination and imaging are essential in the diagnostic process. Before ultrasound was introduced, medical anamnesis and physical examination played a key role in diagnosing infants with HPS. Important signs suggest suspicion of HPS are vomiting in non-bilious projectiles, dissatisfaction after feeding and inability to gain weight (5).
Ultrasound has become the diagnostic mode of choice due to its non-invasive character and ability to directly observe the pyloric canal and all its assets. Although ultrasound is a common practice in most institutions today, many different parameters are used and the evidence is limited by individual studies.

Materials and methods

Retrospective, non-randomized study, carried out for a period of 3 years, 2019–2022, which included a number of 29 patients, with the age between 0-3 months, diagnosed in the Pediatric Clinic of the County Clinical Emergency Hospital of Constanta with hypertrophic pyloric stenosis.

Results and discussions

From the study carried out on the group of 29 newborns diagnosed with HSP, 24 male, to 5 female, a significant predisposition of the male sex can be observed, the ratio is 1.0 : 4.8.

This difference can also be observed in the specialized literature being cited in one of the most extensive case studies that targeted 29,554 cases in the United States of America, between 1999-2010 as being of 5:1 male : female (1).

Figure 1: Distribution of cases according to gender

Seasonal variation refers to the pattern of variation in incidence, prevalence or other health related measures with respect to specific seasons of the year. In the case of hypertrophic pyloric stenosis (HPS), it is observed that the number of cases diagnosed with HPS is higher during certain seasons, specifically in the summer months. There are several studies that have investigated the seasonal variation of HPS. The findings indicate that, for North American continent, the peak incidence of HPS occurred during the summer months (6).

Some researchers have suggested that the seasonal variation in HPS may be related to environmental factors, such as exposure to certain viruses or bacteria during the summer months. Others have proposed that hormonal or genetic factors may play a role. However, more research is needed to determine the exact cause of the seasonal variation in HPS.

It is important to note that the cause of this seasonal variation is not well understood, and more research is needed to determine the exact mechanisms behind it.

Table 1: Clinical manifestations.

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Cases (n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vomiting</td>
<td>29</td>
<td>100%</td>
</tr>
<tr>
<td>Dehydration</td>
<td>24</td>
<td>82%</td>
</tr>
<tr>
<td>Abdominal distension</td>
<td>20</td>
<td>75%</td>
</tr>
<tr>
<td>Weight loss</td>
<td>24</td>
<td>82%</td>
</tr>
<tr>
<td>Lack of stool</td>
<td>19</td>
<td>65%</td>
</tr>
<tr>
<td>Increased appetite</td>
<td>14</td>
<td>48%</td>
</tr>
<tr>
<td>Lethargy</td>
<td>16</td>
<td>55%</td>
</tr>
</tbody>
</table>

The primary symptom of HPS is nonbilious forceful or projectile vomiting after
feeding, which is observed in nearly all cases. Other symptoms include dehydration, which is present in a majority of cases and can manifest as crying without tears and/or reduction in urine output as well as the lack of stools in some cases. Additionally, there is an initial stagnation of weight followed by a decrease in weight, which is also observed in a majority of cases, and can also be associated with crying without tears in a quarter of cases. Other clinical manifestations include lethargy (55%) and visible abdominal distension (75%). These symptoms are crucial for the diagnosis and early treatment of HPS to prevent any complications.

![Figure 3: Measurement of the muscular layer.](image)

The thickness of the circular muscle of the pylorus is a crucial diagnostic criterion in the evaluation of hypertrophic pyloric stenosis (HPS). Studies have shown that ultrasonography is a reliable method for assessing the thickness of the pyloric muscle. The examination by ultrasonography in HPS typically shows an average thickness of 54.5 mm, with a range between 30 mm and 79 mm, these values are consistent with the findings reported in the specialized literature on HPS. It is important to note that a muscle wall thickness of less than 2.0 mm is considered to be within normal limits, while an increase in the thickness of the circular muscle of the pylorus detected by ultrasonography is considered a strong indication of HPS.

**Conclusions**

This retrospective study conducted over a period of 3 years, 2019 to 2022, observed 29 patients diagnosed with hypertrophic pyloric stenosis in the Pediatric Clinic of the County Clinical Emergency Hospital of Constanta. The results of the study showed that male infants had a higher predisposition and also observed a seasonal variation in the number of HPS cases, with a higher incidence during the summer months, although the exact cause for this variation is not well understood. Further research is required to determine the exact cause for the seasonal variation in HPS and to understand the mechanisms behind it, as well as to explore alternative management options for HPS in infants.

**References**