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Congenital hypertrophic pyloric stenosis of 21 days infant: A case report

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***Abstract*---**Hypertrophic Pyloric Stenosis (HPS) is a condition that occurs in infants with an abnormally thickened pyloric stomach, presented with a symptom of projectile vomiting. The cause of HPS is still unclear. However, it may occur due to multiple factors, including racial, environmental, and genetic factors, with the incidence of one to two out of 1000 live births. We reported a Hypertrophic Pyloric Stenosis (HPS) case in a 21-day-old baby girl (baby I) with projectile vomiting and yellowish diarrhea about six days before admission, which was recorded to be more than five times a day. The patient was hospitalized at Anwar Medika Hospital for five days before being referred to dr. Soetomo Hospital, Surabaya, and a pyloromyotomy were performed. Physical examination and radiological investigations (plain radiographs, Upper Gastrointestinal (UGI), and ultrasonography (USG)) supported the diagnosis of HPS. *Ramstedt* pyloromyotomy procedure had been conducted with a diagnosis of post-pyloromyotomy hypertrophic pyloric stenosis.

***Keywords*---**Hypertrophic pyloric stenosis, infants, newborn, *ramstedt* pyloromyotomy, human and illness.

Introduction

Infants commonly have hypertrophic pyloric stenosis (HPS) (1). HPS occurs in 2 to 5 per 1000 live births (2). The disorder is characterized by nonbilious and projectile vomiting in the third and twelfth weeks after birth, which, if left untreated, leads to dehydration, hypochloremic, and hypokalemic metabolic alkalosis (3). HPS is characterized by an abnormal thickening of the muscle layer of the pyloric sphincter, which obstructs the gastric outlet (4).

Regarding the risk factor of HPS, a study on 65 infants with HPS revealed that bottle-fed infants experienced a 4.6-fold higher risk of HPS compared with infants who were not bottle-fed. This study also suggested the importance of exclusive breastfeeding in decreasing the risk of HPS (5). Due breast milk may have lower osmolality, which could provide better gastric emptying (6). The breast milk field contains macronutrients that affected the growth of a child (7).

Case Presentation

Clinical presentation

A 21-day-old baby came with the primary complaint of vomiting. Vomiting and diarrhea occurred about six days before admission to the hospital. The frequency of vomiting and loose stools were more than five times daily with liquid consistency and yellow color. In addition, severe dehydration signs in the form of sunken eyes, low body weight, decreased appetite, distended abdomen in the hypochondrium, and increased peristaltic activity appear in the thin abdominal wall. The mother's pregnancy history was normal. The birth body weight was 3500 g, and the current weight was 2850 g.

Examination findings

On physical examination, palpation was performed, and an olive sign was found in the right upper quadrant of the abdomen. Distension and bowel sounds were found on auscultation.
Laboratory results showed a low potassium level of 3.2 mmol/L based on a normal cut-off point of 3.5-5 mmol/L.

Imaging findings

The radiological examinations in the form of plain babygram photos and abdominal ultrasonography (USG) were performed to establish an accurate diagnosis. On a plain abdominal X-ray, babygram found a single bubble picture which is a typical sign of hypertrophic pyloric stenosis (Figure 1).

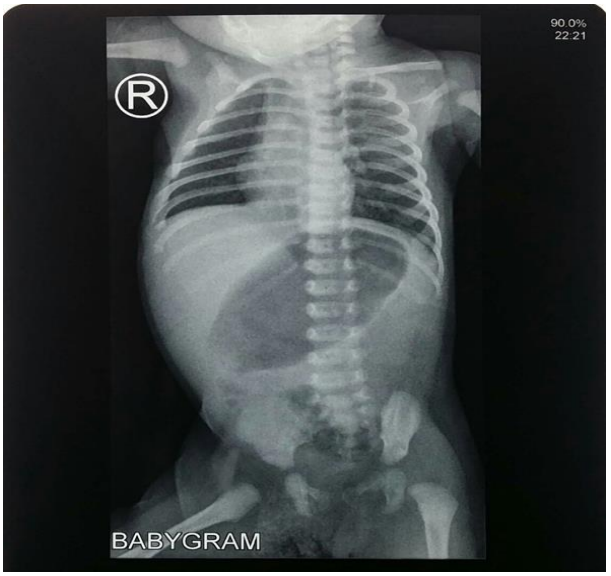

Figure 1. An infiltrate in the left supra-parahillar and a single bubble with minimal shadows of intestinal gas distally in the abdominal and pelvic cavities.

There was continued with upper gastrointestinal series (UGI) examination, and it was found that the pars corpus gastric distension and antrum were accompanied by gastric pyloric narrowing along +/-0.4cm with a diameter of +/-0.3 mm, forming a string sign picture (Figure 2).

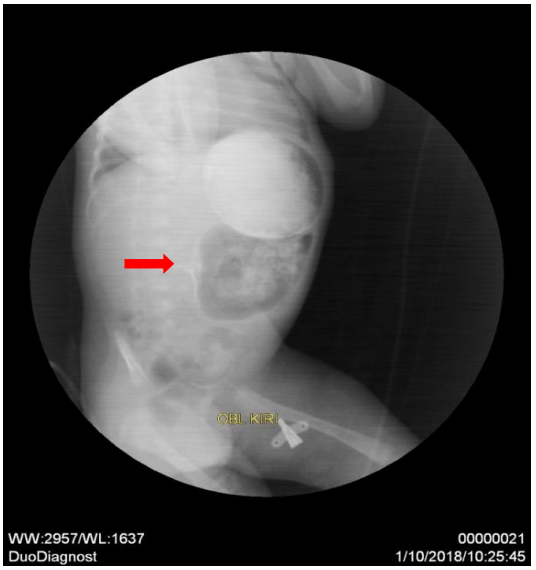

Figure 2. The string sign appearance result of the upper gastrointestinal series examination

The string sign is caused by a narrowing of the pyloric canal which causes little contrast to pass through it. On USG examination abdomen was found with

gastric distension with pylorus length +/- 1.6 cm, a pyloric diameter of 0.5 cm, and a single muscle thickness of 0.23 cm (Figure 3).

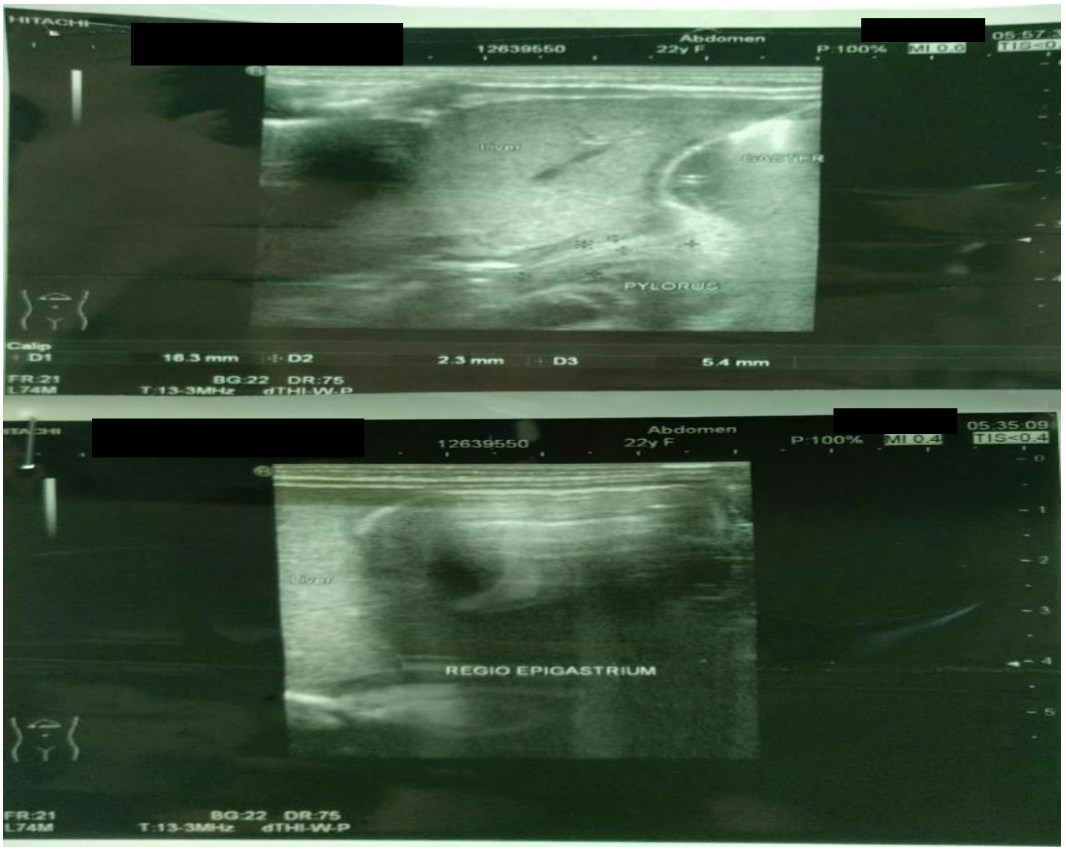

Figure 3. Gastric distension, with pylorus length +/- 1.6cm, pyloric with 0.5 cm and single muscle thickness: 0.23 cm

Discussion

The clinical manifestation of HPS is the obstruction that causes non-bile projectile vomiting after giving formula or breast milk (8). In HPS patients, gastric peristalsis was seen, and an olive-shaped mass in the abdomen was palpable in the right upper quadrant (RUQ) (9). Initially, palpation of an olive-like mass in the RUQ was considered a diagnostic sign without the need for further evaluation (10). However, this is difficult and time-consuming because a crying baby often constrains the clinical examination. Thus, currently, para-clinical use imaging techniques for better detection (11). The frequency of frequent and prolonged vomiting can trigger vomiting of bluish blood due to gastritis. In one study, 66% of patients had hematemesis due to esophagitis or gastritis (12).

HPS patients have stagnation in growth and a decreased body weight (9). In Indonesia, the monitoring of children's growth and development is conducted with

regular screening in *Posyandu*. However, the parent's lack of knowledge about the stages of child development causes them less vigilant in case of development delay in children (13).

Also apparent are signs of dehydration, such as a sunken fontanel, persistent skin wrinkles, and dry eyes. (9). Dehydration might occur as a clinical symptom of diarrhea. A study on sixty-month children in Surabaya found that 88 diarrheal children experienced dehydration; 78 had some dehydration and 10 had severe dehydration (14). Diarrhea is common in infants, however; a study in a tertiary hospital in East Java showed the highest incidence of diarrhea among children in age 0-24 months (15).

Hypochloremia, hypokalemia, and metabolic alkalosis with paradoxical aciduria is a classical presentation of HPS patients with electrolyte derangements. These conditions are more prevalent in newborns with at least three weeks of symptoms (16). The decline of potassium levels enhanced the duration of symptoms. Compare with patients without hypokalemia, the average duration of symptoms was longer in those with hypokalemia (9).

On plain X-ray, babygram found a single bubble which is a sign of HPS. Specific radiographic signs were string signs consistent in fourteen patients with the diagnosis of HPS (17). In 165 individuals with HPS who were treated, the average pyloric muscle thickness was 0.42 cm (range: 0.18 to 0.86 cm), and the average pyloric length was 1.80 cm (range, 0.8 to 2.8 cm). Age and body weight was related to pyloric muscle thickness (18).
Studies involving 60 newborns younger than 21 days of age with confirmed pyloric stenosis revealed that the muscle thickness of younger infants was significantly less than that of older infants (19). Physical examination and radiology support the diagnosis of HPS. The performed action was *Ramstedt* pyloromyotomy with a post pyloromyotomy diagnosis was hypertrophic pyloric stenosis.

Conclusion

This report on the early presentation of HPS suggests its congenital etiology. A physical and radiology examination is required to establish the diagnosis of HPS.

Conflict of interest

The authors declare no conflict of interest

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