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MANAGEMENT OF INFANTILE HYPERTROPHIC PYLORIC STENOSIS

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ABSTRACT

Objective: To review the age presentation, diagnostic modality and treatment of infants with infantile hypertrophic pyloric stenosis with special concentration on role of ultra sound in early diagnosis & decreasing morbidity. **Patients and Method:** Prospective case series study in Department of pediatric surgery, Al-Khanssa Teaching Hospital, Mosul, Iraq from June 2017 to October 2020. The study included 49 patients with infantile hypertrophic pyloric stenosis, infantile age group with non- bilious vomiting. surgical procedure by Ramstedt pyloromyotomy operation through supra umbilical right transverse incision with muscle cutting,an incision is then made over the antero- superior part of the pyloric mass, the pyloric muscle is then widely split down to the mucosa. **Results**: Two patients (4.08%) was presented early in the first week of life, while 7 (14.2%) patients were delayed after age of 16 weeks, the remaining 40(81.6%) presented within usual age presentation between 2-12 weeks. Mild to moderate dehydration encountered in 21(42.8%) patients while severe dehydration occur in 5(10.2%). Palpable olive mass were positive in 22(44.8%) patients, clinically 5 (10.2%) patients operated without need to radiological evaluation, ultra sound were positive in 39(90.5%) of patients, in 8(16.3%) patients barium study need to confirm diagnosis, mucosal perforation occur in 4(8.1%) patient, wound infection occur in 36.1%) patients. **Conclusion**: IHPS is still a common condition affecting infants. Doctors should have high index of suspicion in infants with non-bilious vomiting, to avoid delay in diagnosis. The majority of cases will now be diagnosed with ultrasound.

KEYWORDS: Pyloric Mass, Ultrasound, Pyloromyotomy.

INTRODUCTION

One of the most prevalent gastrointestinal conditions that necessitates abdominal surgery during infancy is infantile hypertrophic pyloric stenosis (IHPS), which affects 1.06 to 4.33 out of every 1000 infants.[2] After the late 1960s, the medical therapy for infantile hypertrophic pyloric stenosis was all but abandoned, and pyloromyotomy emerged as the gold standard.[3] The a etiology of IHPS is still unclear.

Symptoms often appear between the ages of three and six weeks. Rarely, it has been documented in preterm newborns and may manifest sooner.[4] The most frequent presenting symptom is vomiting. At first, it is only regurgitation of meals, but it quickly becomes projectile and bile-free. Fresh or changed blood may be seen in the vomitus in 17–18% of instances; this is typically linked to esophagitis or irritative gastritis.[3,4]

Dehydration and weight loss quickly become evident due to insufficient calorie and fluid consumption. Gastric volvulus, antral web, and preampullar duodenal stenosis are surgical reasons of non-bilious vomiting, whereas gastroesophageal reflux, pylorospasm, and gastroenteritis are common medical causes.[5]

It should be possible to diagnose HPS on clinical features alone in 80-90% of infants.[6] When the clinical signs are uncertain, the diagnosis can be verified by sonography or barium They regarded as abnormal a pyloric canal length exceeding 16 mm and a thickness of 4 mm or greater. According to some researchers, pyloric stenosis may be diagnosed most accurately if the muscle is 5 mm thick or more.[7]

Hypochloremic, hypokalemic metabolic alkalosis is a common metabolic disorder that most patients experience to some extent. Correction is typically obtained less than 24 hours after presentation, and severe dehydration is rarely observed nowadays. Remember that resuscitation is the first priority and that HPS is not a surgical emergency. Because of a reduced respiratory

drive brought on by metabolic alkalosis, inadequate resuscitation can result in postoperative apnea.[8,9]

PATIENT AND METHODS

A prospective study at AL-Khansaa Teaching Hospital in Mosul city in Iraq from 1st of June /2017 to 1st of October /2020. The collection of patients were done by using special data collecting form. Assessment of main clinical symptoms including the onset of vomiting in relation to feeding & weight, in addition to main clinical signs on examination as degree of hydration, palpation of olive mass, feeding test, investigations include base line complete blood count, electrolytes & renal function. Radiological investigation mainly ultrasonography & barium study if needed, then operative finding & post-operative complication.

All our patient admitted to pediatric surgery unit with proper evaluation of hydration state, correction of dehydrated patients by using normal saline initially (if needed) and then glucose 5% with 0,45% saline with adding potassium chloride as maintenance fluid therapy. Surgery was done after correction of dehydration and normalization of electrolyte, confirming diagnosis by examination & palpating pyloric mass under general anesthesia, then through supra umbilical right transverse incision with muscle cutting, mass extracted and classical Ramstedt's pyloromyotomy operation done for all patients.

By gently pulling on the stomach, the surgeon delivers the pyloric tumor. The surgeon then stabilizes the tumor by placing an index finger on the duodenal end of the pylorus. Over the anterosuperior portion of the pylorus, an incision is then made, starting at the well-defined pyloroduodenal junction, which is located around 2 mm proximal to the pyloric vein, and continuing into the thin-muscled stomach antrum. The pyloric muscle is then widely split down to the mucosa using mosquito forceps. When the pyloric muscle has been adequately split, the mucosa can be seen to be bulging indicating adequate myotomy.

The nasogastric tube is used to inflate the stomach, and the flow of air from the pylorus to the duodenum is verified in order to screen for mucosal damage. The pylorus is then returned to the abdomen. All patients have this treatment, which involves closing the peritoneum with 3-0 polyglactin (Vicryl) and approximating the muscles with 3-0 (Vicryl). The complications that arose were assessed and handled appropriately.

Postoperative hospital stay were about two days and starting oral feeding started within 24 hours for uncomplicated patients, admission to intensive care unit for critical cases also put an nasogastric tube in complicated patients, discharge after 4-5 days for complicated, all our patients followed up to 1 month post discharge.

RESULTS

Forty nine patients were diagnosed as IHPS, 39(79.5%) were males, 10(20.2%) were females, 41(83.8%) were full term, 8(16.3%) were first born baby. Family history was positive in 3 patients (6.1%).

Unusual age presentation encountered in 9 patients, 2 patient (4.08%) was presented early in the first week of life, while other 7(14.2%) patients were delayed in their presentation, five of them at age of 16 weeks & three at age of 20 weeks, while the remaining 41(83.6%) presented within usual age presentation between 2-12 weeks table (1).

Table (1): Age presentation.

Age (weeks)		number	%
1-2		1	3.8
2-12	2-4	7	26.9
	5-8	8	30.7
	9-12	5	19.2
12-20	13-17	3	11.5
≥ 20		2	7.6

Non bilious vomiting was presenting symptoms in all patients, 38(77.5%) of them were projectile vomiting & 11(22.4%) were non projectile. Mild to moderate dehydration encountered in 21(42.8%) patients while severe dehydration at time of presentation occur in 5(10.2%), one patient was severely dehydrated with (metabolic alkalosis) admit to intensive care unit on ventilator & died preoperatively, remaining 23(46.9%) were well hydrated most of them were already in hospital for other causes. Palpable olive mass were positive in 22(44.8%) patients. Feeding test was performed in 34(69.3%) only of our patients, 7(20.5%) of them show positive test table.

Depending on clinical evaluation (5) patients (10.2%) operated without need to radiological evaluation (ultra sound or barium study).confirming diagnosis by ultra sound were done in 43(87.7%) patients 39(90.5%) of them were positive (Figure 1), the remaining 5 patients were equivocal need barium study which show features suggestive for IHPS (dilated stomach & delay gastric emptying) as shown in (Figure 2).

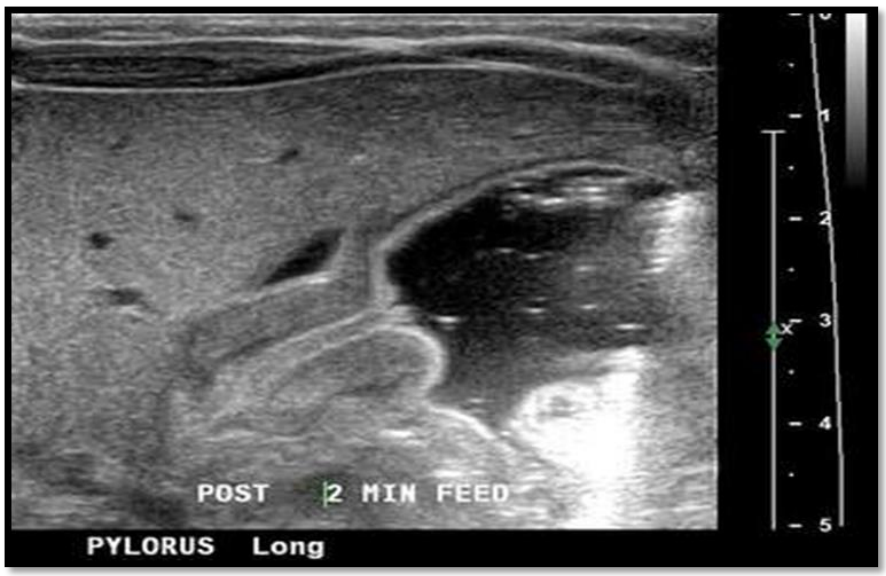

Figure (1): Ultrasonographic picture show Thickened & Elongation of pyloric muscle (AL-Khansaa Teaching Hospital).

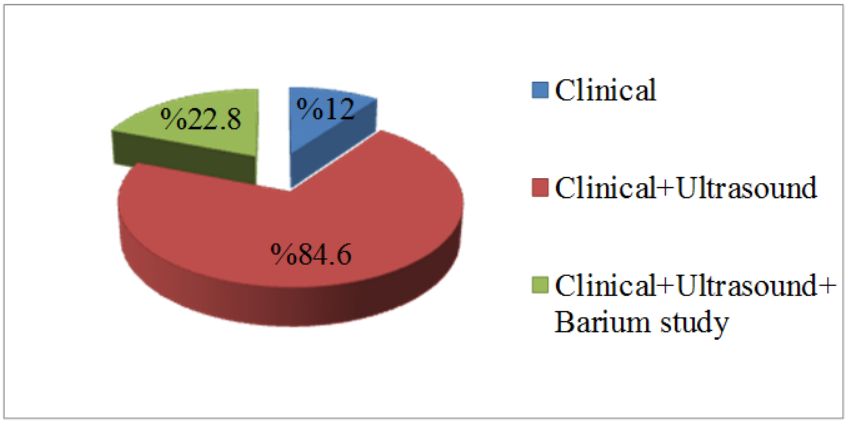

Figure (2): Preoperative Diagnostic Criteria

Ramstedt's pyloromyotomy done for 48 patients (Figure 3,4), complications encountered intra operatively were mucosal perforation on stomach side in 4(8.1%) patient, postoperative vomiting in 9(18.3%) patients, wound infection occur in 3(6.1%) patients.

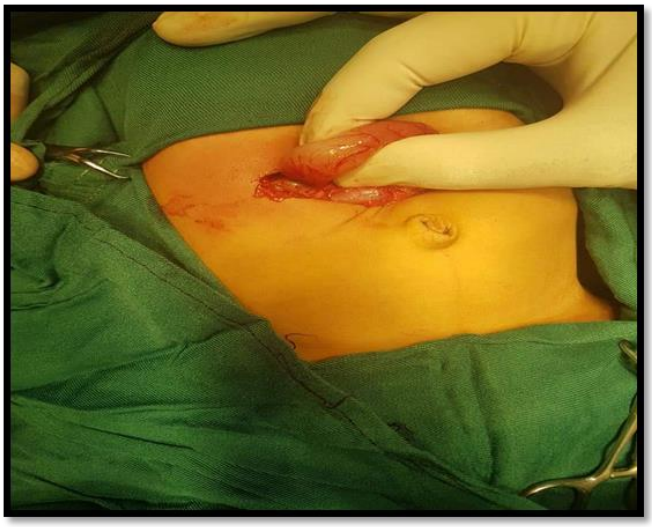

Figure (3): Extraction of pyloric mass.

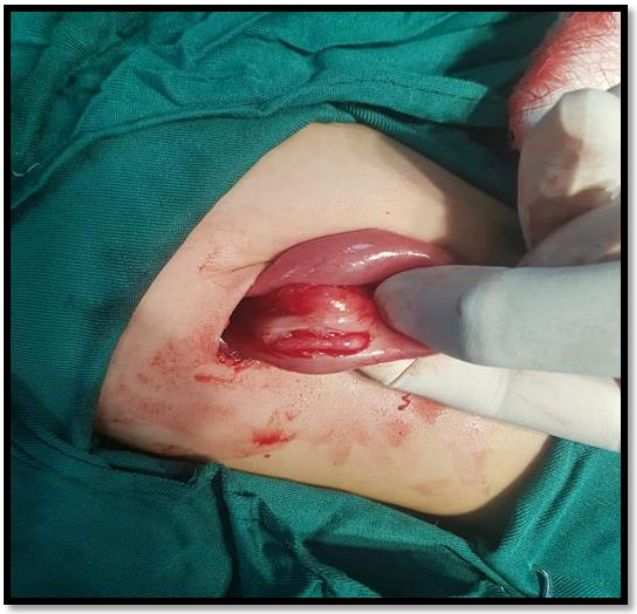

Figure (4): Ramstedt's pyloromyotomy.

DISCUSSION

IHPS common disorder affect infantile age group babies. The mean age presentation is about 5-8 weeks which similar to Chalya et al[10] which found that the median age of 102 patients was 5 weeks & Ndongo et al.,[11] which reported that the mean age at presentation was 5.2 ± 1.2 weeks.

In our results show (40.8%) of patients had early presentation. This early presentation was noticed in Burki et al.,[12] which showed that most of the patients with hypertrophic pyloric stenosis (HPS) present between 3 and 6 weeks of age. The early presentation of hypertrophic pyloric stenosis (HPS) is a notable aspect of its clinical profile, with a significant percentage of patients presenting within the first few weeks of life. Research indicates that while the typical age of presentation is between 4 to 6 weeks, cases have been documented as early as the first week of life, highlighting the variability in onset.[12] This early presentation can be influenced by various factors, including genetic predispositions and concurrent gastrointestinal anomalies.[13]

In comparison to clinical presentations non bilious projectile vomiting is the most common symptoms[5], Our results showed that mild to moderate degree of dehydration is noticed in (53%) of patients. The findings indicate that mild to moderate dehydration is prevalent in 53% of patients diagnosed with infantile hypertrophic pyloric stenosis (IHPS). This condition, characterized by gastric outlet obstruction due to hypertrophy of the pyloric muscle, often leads to significant clinical manifestations, including dehydration and metabolic imbalances. IHPS typically presents with projectile non-bilious vomiting, which can lead to dehydration and electrolyte disturbances.[15] A study found that 76% of infants exhibited electrolyte abnormalities upon admission, highlighting the frequency of dehydration in this population.[16]

Feeding test was not applied in most patients so give less specific results positive only in (20%) of patients when compare with Gilani et al (40%) of patients are positive[17], & Resheed study[18] in which, 146 infants suspected of IHPS were scanned and their sonographic results (47.25%) were declared positive. This may explained by feeding test done only in 34 patients from 49 patients in our study this may be attributed to that referring of patients with complete investigations & diagnosis in addition to the difference in expert of pediatric surgeon in doing test.

Palpable olive mass in our study was (44.8%) of patients which is nearly higher that the finding of Arnold et al.,[19] which found that only four patients (21.1%) had a palpable olive. The presence of an olive is thought to be pathognomonic of this condition, warranting no further investigations. The lack of experience of the examining doctor could play a role in this under-representation. In Jaafara et al study[20], it was palpable in 31 (51.66%) patients.

The role of ultrasonography in confirming diagnosis was positive in (90.5%) of patients in our study which is near to Jaafara et al study[20] which showed that the diagnosis was made in 100.0% of the patients and higher than Karim et al.,[21] in which positive finding was confirmed in (87.1%). This may explained by that ultrasound is radiologist-dependence, repeat test by more than one radiologist & use of high resolution ultrasound machine which increase success rate of diagnosis. Barium study in our study is not widely used only apply for 8 patients while in Jaafara et al study[20], barium study was performed in all patients but different signs were noted.

Ramstedts pyloromytomy operation is standard applied with supra umbilical transvers incision done for all our patients although many centers apply laparoscopic pyloromyotomy but laparoscopy not used in our study. There is increased incidence of wound infection rates in 6.1% of patients in our results which was similar to that of Dash et al.,[22] but lower than other studies; 10% in Muse et al.,[23] and 11.1% in Peyvasteh et al.[24]

CONCLUSION

IHPS is still a common condition affecting infants. Providers of health services in pediatric age group should have high index of suspicion in infants with non-bilious vomiting to avoid delay in diagnosis. Inheritance may play role in etiology of IHPS. The majority of cases will now be diagnosed with ultrasound which is radiation free & easy applicable. Ramstedt's pyloromyotomy is still standard & safe operative technique in treatment.

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