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Evaluation of Management of Infantile Hypertrophic Pyloric Stenosis in Aba, South East Nigeria.

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Abstract

Introduction: Congenital disease, characterized by a thickening (hypertrophy) of the pyloric muscular layer, forming an obstacle in the way of the alimentary bolus between the stomach and duodenum. **Methodology:** The study was conducted over a period of 4 years March 2016 to March 2020 at the Pediatric surgery unit, Department of Surgery at the Abia State University Teaching Hospital Aba Nigeria. The study was conducted after approval from institutional ethical committee. The results were entered in a pre-formed proforma and analyzed in terms of demographic characteristics of the patients, common clinical features, complications, surgical treatment, post-operative complications and growth and development of these infants over prolonged follow up. The data was studied using SPSS and results presented in percentages and tables. **Results:** This study comprises of 30 infants 25 (83%) were males and 5 (17%) were females with an M: F ratio of 5: 1. most of the infants (66.7%) presented with non-bilious projectile vomiting in between 4-8 weeks of life, dehydration was found to be present in all the infants. Hyponatremia and hypernatremia were found in 10 (33.3%), 5 (16.7%) while hypokalemia was found in 10 (33.3%) patients. congenital hypertrophic pyloric stenosis ultrasonography which showed pyloric thickness of more than 4mm was found in 25 (83.3%) of the patients while pyloric length was found to be more than 16 mm in 28 (93.3%) patients. Feeding was started after surgery 72 hours in 25 (83.3%) while it was started in remaining 5 (16.7 %) patients after 72 hours. Complications were chest infection, vomiting and wound gaping which was seen in 10 (33.3%), 7 (23.3%) and 5 (16.7%) patients respectively. **Conclusions:** Congenital hypertrophic pyloric stenosis presents late in our environment and occurs mainly in term males No significant relationships between age, weight, duration of symptoms and pyloric tumor length and wall thickness were noted.

Keywords: Pyloric stenosis, children, evaluation, management.

Introduction:

Congenital disease, characterized by a thickening (hypertrophy) of the pyloric muscular layer, forming an obstacle in the way of the alimentary bolus between the stomach and duodenum [1]. The incidence of infantile hypertrophic pyloric stenosis (IHPS) is dropping worldwide,[1,2] and this has been linked to increased acceptance and practice of exclusive breastfeeding in newborns. Several studies have suggested that bottle feeding rather than breastfeeding increases the risk for IHPS [4,5]. Incidence varies between countries: In Europe and North America there are 1-3 cases of hypertrophic pyloric stenosis in1000 births. For the Asian and African populations the

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incidence is 1 case of hypertrophic pyloric stenosis in 2000 births. There are 4 males affected by the disease for every 1 female affected. Also 1 in every 14 children whose parents suffered from the disease develops the disease. Given the data it results that the disease has a sex related genetic transmission pattern [5]. There are multiple theories as to what causes the disease:

1. Malformation theory: it states that the disease is caused by a delay in the development of the myenteric plexus, the pyloric tumor being present since birth
2. Spastic hypertrophy theory: the hypertrophy is caused by an abnormally increased contraction of the pyloric muscle fibers. The increased contraction may be caused by an increased adrenaline secretion.
3. The endocrine theory: the disease is caused by an abnormal secretion of the suprarenal gland

The pylorus is enlarged with marked vascularization and inside the lumen the mucosa is folded, edematous. A section trough the pyloric region reveals a thickened pyloric musculature. Non-bilious vomiting at 3 weeks after birth which is in small amounts but after a few days explosive vomiting that is projected over distance is present [6]. There is growth stagnation and a decrease in body weight. Constipation and hyperchromatic urine are also present. The children are anxious and have a superficial respiration. Signs of dehydration are also present: depressed fontanel, persistent skin folds, and dry eyes. Abdominal examination is generally supple, with no pain upon palpation. Epigastric distention with visible peristaltic waves, palpation of the pyloric olive in the right hypochondriac region [6].

Methodology: The study was conducted over a period of 4 years March 2016 to March 2020 at the Pediatric surgery unit, Department of Surgery at the Abia State University Teaching Hospital Aba Nigeria. The study was conducted after approval from institutional ethical committee. This study comprises infants having non- bilious vomiting and ultrasonography features of congenital hypertrophic stenosis. All the patients underwent detailed history, clinical examination, investigation and surgical treatment. Family history with an emphasis to find out the history of similar complaints in any other first or second degree relatives was also taken. The standard surgical treatment consisted of Ramstedt's pyloromyotomy in all the patients that entails location of the pyloric stenosis, a longitudinal incision along relatively avascular surface of tumor through serosa and splitting of pyloric muscle with blunt dissector until the mucosa bulges. The results were entered in a pre-formed profoma and analyzed in terms of demographic characteristics of the patients, common clinical features, complications, surgical treatment, post-operative complications and growth and development of these infants over prolonged follow up. The data was studied using SPSS and results presented in percentages and tables.

Results: This study comprises of 30 infants 25 (83%) were males and 5 (17%) were females with an M: F ratio of 5: 1.

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The analysis of age at presentation revealed that most of the infants (66.7%) presented with non-bilious projectile vomiting in between 4-8 weeks of life. The age at presentation was less than 4 weeks and more than 8 weeks in 8 (26.7%) and 2 (6.7%) patients respectively.

Table1. Age at presentation.

Age at presentation	Number of patients	percentage
<4weeks	8	26.7
4-8weeks	20	66.7
>8weeks	2	6.7

The study of birth order of the affected infants with congenital hypertrophic pyloric stenosis revealed that 22(73%) of the infants were 1st by order of birth while remaining 8 (7%) infants were second by order of birth. Above 2 observations suggested that first born male children were found to be most commonly affected by congenital hypertrophic pyloric stenosis.

The analysis of the weight of the infants revealed that most of the infants had a normal weight expected for the age. While 20 (66.7%) infants were found to be having normal weight, 10 (33.3%) patients were found to be having weight less than expected for their age.

Table 2: Nutritional status of patients

Nutritional status	Number of patients	percentage
Underweight	10	33.3
Normal weight	20	66.7
Total	30	100

In most of the infants the vomiting initially was less forceful but gradually, the vomiting increased in force eventually to become projectile. In all of the patients (100%) the vomiting was non-bilious and there was no infant who presented with bilious vomiting.

Table 3: Type of Vomiting

Vomiting	Number of patients	percentage
Non-bilious vomiting	30	100
Bilious vomiting	0	0
Total	30	0

Since there were case reports describing increased incidence of congenital hypertrophic stenosis in identical twins pointing toward the possibility of genetically factors involved in causation of congenital hypertrophic pyloric stenosis a family history of all patients for presence of CHPS in infancy was taken. It was found that 2 (6.7%) patients had a positive family history of CHPS in first or second degree relatives. Rest of 28 (93.3%) patients didn't have such history.

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Table 4. Family history

Family history	Number of patients	percentage
Positive	2	6.7
Negative	28	93.3
Total	30	100

Constipation and jaundice was present in 5 (10%) and 10 (16%) patients respectively. Palpable epigastric lump a characteristic findings of congenital hypertrophic pyloric stenosis was seen in 20 (67.7%) patients while 10 (33.3%) patients had no palpable epigastric lump. Abdominal distension was present in 5 (16.7%) while it was absent in 25(83.3%) patients. Visible peristalsis was present in 15 (50%) patients. It was characteristically seen moving from right to left from infant's upper abdomen. The peristalsis was more marked during feeding or just before emesis.

Table 5: Clinical presentation.

Clinical presentation	present	percentage	absent	percentage
Constipation	5	16.7	25	83.3
Jaundice	10	33.3	20	66.7
Palpable epigastric lump	20	66.7	10	33.3
Visible peristalsis	15	50	15	50
Abdominal distension	5	16.7	25	83.3

The dehydration was found to be present in all the infants though in 15 (50%) cases the dehydration was only mild, 10 (33.3%) infants had moderate dehydration and 5(16.7%) had severe dehydration.

Table 6: Presence of dehydration.

Dehydration	Number of cases	Percentage
Absent	0	0
Mild	15	50
Moderate	10	33.3
Severe	5	16.7
Total	30	100

Dyselectrolytemia was a common occurrence in infants with CHPS. The most common cause of dyselectrolytemia was frequent vomiting seen in these infants. Hyponatremia and hypernatremia were found in 10 (33.3%), 5 (16.7%) while hypokalemia was found in 10 (33.3%) patients

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Table 7. Dyselectrolytemia

Electrolyte imbalance	No of patients	percentage
Hyponatraenia	10	33.3
Hypernatremia	5	16.7
Hypokalaemia	10	33.3
Hyperkalaemia	0	0

Ultrasonography was done in all the patients with congenital hypertrophic pyloric stenosis which showed pyloric thickness of more than 4mm was found in 25 (83.3%) of the patients while pyloric length was found to be more than 16 mm in 28 (93.3%) patients. Taken together these 2 ultrosongraphic parameters were found to be having sensitivity of more than 90 % in the diagnosis of CHPS.

Fredet-Ramstedt's pyloromyotomy was done in all the infants presenting with congenital hypertrophic pyloric stenosis. After the surgery, feeding was started within 72 hours in 25 (83.3%) while it was started in remaining 5 (16.7 %) patients after 72 hours. The study of complications occurring in infants revealed that the common complications were chest infection, vomiting and wound gaping which was seen in 10 (33.3%), 7 (23.3%) and 5 (16.7%) patients respectively.

After discharge the patients were follow up. 20 (66.7%) patient remained in regular follow up while 10 (33.3%) patients were lost to follow up. Amongst the patients who remained under follow up satisfactory growth and development was seen.

Discussion:

Congenital hypertrophic pyloric stenosis has been one of the most common cause of gastric outlet obstruction and surgical cause of vomiting. It most commonly affects first born male children. In this series first born male infants were affected more commonly than female. These findings were in conformity with the studies conducted in this sub-region and worldwide[7].

In this series most of the infants presented with vomiting and dehydration between 4-8 weeks of life followed by within 4 weeks and 8-12 weeks. The age of presentation is usually from 4 to 8 weeks of life. None of our patients presented after the age of 12 weeks of life. These findings were similar to the studies in this sub-region and worldwide[8-10].

The clinical presentation of congenital hypertrophic pyloric stenosis includes projectile non-bilious vomiting, visible peristalsis and a palpable lump in right upper quadrant. In this study the infants had projectile non-bilious vomiting, visible peristalsis and palpable lump was found in 100%, 50% and 66.7% respectively. similar findings were noted by other authors. However, this series shows incidence of constipation, jaundice and dehydration in 16.7 %, 33.3% and 100% as shown in Table 5. Dyselectrolytaemia leading to hyponatremia, hypernatremia and hypokalemia was seen in 23.3%, 6.6% and 30% patients respectively. [11-13]

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The ultrasonography of abdomen is a sensitive and specific test for diagnosis of CHPS. In this study ultrasonographic finding of pyloric thickness of more than 4mm was seen in 24 (80%) of the patients while pyloric length was found to be more than 16 mm in 29 (96.7%) patients. The sensitivity of ultrasound for the diagnosis of CPHS was found to be 90%.[15-17]

All had open pyloromyotomy through a transverse right upper quadrant incision. There was no use of curvilinear supraumbilical incision.[18] Facilities for laparoscopic pyloromyotomy were absent, and hence, this method was not used. Non-operative management with the use of atropine sulphate was not employed in the patient management. Feeding was started within 72 hours in 25 (83.3 %) patients while it was started in remaining 5 (16.7 %) patients after 72 hours. Similar post-operative feeding pattern were seen by Aspelund[19]. Vomiting and chest infection were the most common complications seen postoperatively. Similar findings were noted by Tan et al [20,].

Conclusion: IHPS presents late in our environment and occurs mainly in term males No significant relationships between age, weight, duration of symptoms and pyloric tumour length and wall thickness were noted. Pre-operative mortality was significantly associated with longer duration of symptoms.

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