Ultrasound and Infantile Hypertrophic Pyloric Stenosis (IHPS) Early Detection Better Patients

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The role of ultrasound in the diagnosis of Infantile Hypertrophic Pyloric Stenosis (IHPS) can not be over emphasized. The easy availability of this reliable imaging modality may contribute to prompter diagnosis and early treatment . The author wishes to present comparison of two series, of 52 patients each, conducted in the same department, but five years apart. Spread over more than a decade our experience with IHPS patients has undergone dramatic changes, especially the diagnostic part of it. Salient features of the two studies will be highlighted. In addition the study will examine whether the easy access to ultrasound has affected the care of infants with pyloric stenosis.

Key Words: Infantile Hypertrophic Pyloric Stenosis (IHPS) Ultrasound.

An accurate diagnosis of infantile hypertrophic pyloric stenosis (IHPS)can be made on clinical grounds. Palpation of pyloric "tumour" is the hallmark of diagnosis . With the easy availability of ultrasonography the trend is changing. The ultrasonic confirmation of diagnosis is obtained in majority of cases. Many of times a general practitioner has had the ultrasound done, even before the treating surgeon examines the patients for the first time. Although this trend is regrettable but the impact of the routine ultrasonography by the general practitioners, on the management of IHPS, needs to be quantitated. The author has been working in the same unit for the last 14 years and had the chance of monitoring the changing trends in the presentation and outcome of the management of the patient of IHPS. Comparison of the two studies, 5 years apart, has been made along with the review of the literature.

Patients and methods

Both the studies were conducted at the Paediatric Surgery and Radiology Departments of Mayo Hospital, Lahore. After screening the patients of non bilious vomiting all the patients of IHPS were included

STUDY I:

This study was conducted from January 1989 to January 1992. A total of fifty two (52) patients with the diagnosis of IHPS were included:

STUDY II:

Jan 1987 to Jan 1992 a total of fifty two patients were also included in this study.

Detailed history and examination of every patient was recorded according to a proforma with special reference to age, sex, weight, age of onset of symptoms, time delay between onset of symptoms and presentation to the hospital.

In Study I only 8 patients had their ultrasound done before reporting to our unit while in study II. 38 patients had one or more than one ultrasound reports before the final presentation. All the patients had their ultrasonography done to compare the accuracy of the two modes of diagnosis i.e. clinical Vs ultrasound. During the study -I the sonologist was no match to the clinical mode of diagnosis but study II revealed much better results in favour of the sonologist . This observation also holds true for the sonologists working outside our department.

All the patients were assessed for their degree of dehydration, metabolic acidosis and alkalosis, hypokalemia and hypochloremia.

After correction of the dehydration and biochemical abnormalities, every infant underwent Ramstedt's pyloromyotomy. Operative findings were corroborated with the clinical and ultrasound observation. The patients were followed up for one month. The results of these two studies are compared.

Results

Fifty two (52) cases were included in each study. Comparison of two studies according to sex distribution in shown in table - I

Table 1. Sex distribution of two studies.

Study	Boys	Girls
I	46(88.46%)	6(11.54%)
II	40(76.93%)	12(23.07%)

Table 2. Comparison of the two studies, according to age of presentation of the patients.

Age presentation	Study I	Study I
0-4 weeks	11(21.16 %)	10(19.24%)
4-6 weeks	24 (46.16%)	32(61.53%)
6-8 weeks	08(15.38%)	09(17.30 %)
> 8 weeks	09(17.30 %)	01(1.935)

The mean age of presentation in study I was 41.26 days while it was 34.86 days in study II

Table 3. Time lapse between the onset of disease and hospital admission.

Time lapse in weeks	Number of patients	
	Study-I	Study-II
0-1	09(17.305)	11(21.15%)
1-2	08(15.38%)	22(42.30%)
2-3	17(32.69%)	15(28.85%)
3-4	08(15.38%)	02(3.85%)
4-5	06(11.54%)	1(1.93%)
5-6	02(3.85%)	1(1.93%)
6-7	01(1.93%)	-
7-8	01(1.93%)	-

Comparison of the degree of dehydration in two populations of the patients is shown in Table 4.

Table -4 Degree of dehydration:

Degree of dehydration	Number of patients	
	Study I	Study II
Mild	06(11.54%)	18(34.62%)
Moderate	29(55.77%)	24(46.15%)
Severe	17(32.69%)	10(19.23%)

Weight distribution amongst the two groups of population is shown in Table 5:

Table 5: comparison of weight distribution.

Weight in Kg	No. of patients	
	Study I	Study II
1.5-2	08(15.38%)	4(7.69%)
2.1-2.5	19(36.54 %)	28(53.85%)
2.6-3	20(38.46%)	18(34.62%)
3.1-3.5	04(07.69%)	2(3.84%)
3.6-4	01(01.93%)	

In study I Nine (17.31%) patients had haematemesis while only four (7.69%) patients had the same problem in study II. Correlation of Mean serum sodium, potassium and chloride level with degree of dehydration is shown in Table 5.

Table 5 correlation of Mean Na+ K+ & Cl' Level with degree of dehydration.

Degree of dehydration	Magnesium concentration		
	Na+	K+	Cl
Mild	139.5	4.3	105
Moderate	135	3.9	87.6
Severe	133.8	3.6	82.4

The sonographer could diagnose only three (5.76%) cases in study I but 40(78.84%) babies could be diagnosed accurately in study II.

Comparative biochemical profile showing the degree of acid base imbalance is shown in

Table 6 Biochemical profile on admission.

Acid base status	Study I	Study II
Normoacidaemic	2 (3.85 %)	12 (23.07%)
Alkalaemic	50(96.15 %)	37 (71.15%)
Acidaemic	00	03(05.76%)

During study I fifteen patients (23.85%) needed hyperalimentation and transfusion before surgery could be contemplated. Only 6(11.53%) needed transfusion in study II. Three patients (5.76%) died before any surgical intervention in study I, while no death occurred in study II. Mean hospital stay in study I was 12.46 days while it was 6.50 days study II. During study I 4(7.69%) Ramstedt's pyloromyotomies were done under local Anaesthesia while every procedure in study II was done under general anaesthesia. Post operative wound dehiscence occurred in 8(15.38%) cases in study I while no such complication was noted in study II. Wound infection was noted in 9(17.30%) cases in study I while only 2(3.34%) cases needed drainage of subcutaneous collection of pus in study II.

Discussion

Palpation of the pyloric tumour is the cornerstone in the diagnosis of IHPS. But it is an art which requires great patience. Success rate of finding a pyloric tumour varies from 85-100%[1]. In about 50% of infants with IHPS, a pyloric " tumour " can be felt on the initial examination. The remaining 50% are struggling so that the initial palpation is not sufficient to reveal the tumour[2]. The advent of ultrasound has revolutionized the approach towards the diagnosis of IHPS . The use of ultrasound has become increasingly popular since it was first report in 1977[3] and later on standardized by pioneers in this field[4,5,6,7]. The ultimate criterion for the ultrasound diagnosis was laid down by GruBner et al[8].

Despite the controversies in abdominal imaging ultrasound examination has become the diagnostic test of choice for IHPS [9]. Now the ultrasound examination is said to have a sensitivity of 0.89 and a perfect specificity[10].

The sonographer involved in study I could pick up only three (5.76%) cases. The dismal situation can be explained by the lack of proper training. Any sonographer trained in adult radiology was made to serve the paediatric population. With better training and increasing exposure to the IHPS patient the situation has improved over the last decade (5.76% Vs 78.84% Ultrasonic Diagnoses). The mean age of presentation has decreased from 41.26 days to 34.86 days.

The patients are referred early with lesser degree of dehydration (11.54% Vs 34.62% for mild dehydration and 32.69% Vs 19.23% for severe dehydration in study I and II respectively). Only 8(15.38%) patients had the ultrasound done before reporting for expert help during study I while 38(73.08%) babies had already been scanned ultrasonically before coming to our unit in study-II. More babies were normoacidaemic in study-II, 12(23.07%) patients as

compared to 2(3.85%) patients in study-I. Fifteen (23.86%) patients needed hyperalimentation and transfusion during study I. Only 6(11.53%) needed transfusion in study II.

Three (5.76%) patients died in study I while no death occurred in study II. Mean hospital stay was 12.46 days for study I patient while it reduced to 6.50 days in study I. During study I four (7.69%) surgical procedures were done under local anaesthesia because of the marasmic nature of the patients , while no such risk was warranted in study II. Three (5.76%) patients died in study I while no death occurred in study II.

Although many factors are responsible for the overall improvement in the morbidity & mortality of the patients of IHPS, the role of ultrasound in the early diagnosis cannot be ignored. However the ultrasonic confirmation of the diagnosis of IHPS is obtained, often before clinical evaluation by the surgeon. This routine should not be encouraged as it will lead to gradual atrophy of the clinical skills[11].

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