ULTRASONIC DIAGNOSIS OF HYPERTROPHIC PYLORIC STENOSIS: AN EXPERIENCE AT GOVERNMENT LADY READING HOSPITAL PESHAWAR

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ABSTRACT

BACKGROUND: To correlate the preoperative ultrasonic findings with the post operative finding of infantile hypertrophic pyloric stenosis.

OBJECTIVE: The objective of our study is to correlate the preoperative ultrasonic findings with the post operative finding of infantile hypertrophic pyloric stenosis.

MATERIAL AND METHODS: It was a cross sectional descriptive study conducted at Lady Reading Hospital Peshawar from 1st Jan 2014 to 30th October 2014. A total of 58 infants age from 15 days to 8 months presented with chief complaints of bilious vomiting were included in the study. Ultrasound was performed after clinical diagnosis and both the findings were correlated with post operative findings. Independent variables were the age, sex, length and diameter of pylorus muscle while dependent variables were the duration of disease, ultrasound and clinical findings. Data was recorded on structured proforma and was analyzed on SPSS version (20)

RESULTS: Out of 68 patients 75% (51) were male and 25% (17) were female. Gastric peristalsis was visible in 100% patients, while mass was palpable in 23% (15) patients. Pyloric canal length was above the standard length in 93% cases while pyloric diameter and pyloric muscle thickness was more than standard in 82% and 78% of the cases. The sensitivity of the ultrasound was 98% while comparing with gold standard of postoperative findings.

CONCLUSIONS: Ultrasound is the investigation of choice due to its non invasive nature. Pyloric canal length and diameter is more sensitive than the pyloric muscle thickness for ultrasound diagnosis of the infantile hypertrophic pyloric stenosis.

KEYWORDS: Ultrasound, infant, pyloric stenosis, olive, clinical diagnosis

INTRODUCTION

Infantile pyloric stenosis is a relatively common condition affecting otherwise healthy infants between the age of 3 to 6 weeks¹. The incidence of infantile pyloric stenosis ranges from 1.5 to 2 per 1000 live births affecting mainly male babies with reported ratio of 2:1 to 5:1 and being more frequent in first male born^{1,2}. Recently evidence suggested the association of maternal use of macrolides during the first two weeks after birth and development of infantile pyloric stenosis³. While some of the researchers explain it as hereditary characteristics⁴. The etiology and pathogenesis of this condition is unknown^{5,6}. Most of the patient can usually be diagnosed clinically by the detection of a pyloric olive on examination performed by experienced examiners^{7,8}. In a few cases in which clinical

findings are inconclusive, further investigations may be required to confirm the diagnosis⁹. Ultrasonography is a useful and objective diagnostic method that is non invasive¹⁰⁻¹³. Ultrasonographic diagnostic criterion of hypertrophic muscular thickness 04 mm of thickness is debated^{14,15}. Anyhow the diagnosis of pyloric stenosis can often be made by ultrasound and this should be the first approach¹¹.

MATERIAL AND METHODS

Sixty eight infants who had vomiting 51 males and 17 females between the ages of 15 days to 8 months were referred from (both indoor and outdoor) pediatric surgery and pediatric medicine units of Lady Reading Hospital, Peshawar for ultrasonographic diagnosis of suspected infantile

hypertrophic pyloric stenosis from 1st Jan 2014 to 30th October 2014. Color Doppler "Nemio" by Toshiba Corporation Japan was used for this high resolution scan. The ultrasonographic findings were correlated with operative findings. The data was collected by using a proforma. Patients suffering from infantile pyloric stenosis on both clinical grounds and ultrasound finding of the mentioned age range were included in the study while those who had vomiting secondary to other causes and did not have ultrasonographic findings of infantile pyloric stenosis were excluded from the study. The data was analyzed with the help of SPSS version 20.

RESULTS

The use of high resolution B can revealed infantile pyloric stenosis in 25 patients, in these the sonographic findings were consistent with the standard diagnostic criteria that is muscle thickness of more than 4 millimeter (mm), pyloric diameter more than 15mm and pyloric length more than 18 mm¹². In the rest of 43 patients ultrasound findings were inconclusive. The ultrasonographic diagnosis was confirmed by surgical procedure. There was no false negative or false positive case.

Muscle thickness, pyloric diameter and pyloric length are presented in the table 1-3.

Table No 1: Muscle Thickness on ultrasound. (Normal value less than 4 mm) n=25

Muscle Thickness in Millimeter	No Of Patients
5	18
6	7

Table no 2: Ultrasound measurement of Pyloric diameter n=25

In Millimeter Normal Value less than 15 mm	No of patients
16	14
17	9
18	1

Table No 3: Ultrasound measurement of Pyloric length

In millimeter (normal value less than 18 mm)	No of patient
19	16
29	09

DISCUSSION

After comparing the ultrasonographic results in HPS with the operative findings in this study, it is concluded that ultrasonography is the method of choice¹⁶. It has specificity of 100% and sensitivity of 98%¹⁶. Though a confident diagnosis can be made in 85 to 90% of patients having specific clinical symptoms and a palpable tumor, but at times clinical diagnosis is misleading and normal pylorus is found during the surgical procedure. So the usefulness of diagnostic imaging for obtaining objective and reliable evidence is great. It is important to decide which one would be superior, upper gastrointestinal series which had practiced for long time or ultrasonography which is gaining popularity in recent years.

The advantages of ultrasonographic diagnosis include, first it is non invasive, secondly no fear of aspiration as related with upper gastrointestinal series, thirdly, it can be easily performed at bed side, fourthly pylorus tumor can be drawn three dimensionally. The disadvantages of this technique include, firstly it is difficult to grasp the entire stomach, secondly, it is difficult to judge images under pressure of air, thirdly requires skill in technique and reading images; fourthly, it is difficult to obtain clear image if the infant cries¹⁷.

Several reports have shown its successful use¹⁸. The precise correlation of ultrasonographic and operative finding has documented 100% sensitivity and specificity in many studies^{11, 19, 20}.

Hulka et al reported that from the view point of cost, upper gastrointestinal series is superior to ultrasonographic diagnosis because upper

gastrointestinal series requires secondary inspection less frequently than ultrasonographic diagnosis, but ultrasound provides a high application value because it is free of exposure and invasion and can be easily practiced at the bed side like a stethoscope²¹. Many reports are documented on measurement of pyloric tumors by ultrasound in which diameter of 1.5 centimeter (cm) or more is advocated by Strauss et al²². And muscular thickness of 4mm or thicker is advocated by Blumhagen et al¹⁵. Likewise the studies by Kitamura et al and Ito and Koyangi yielded the same values^{23, 21}. Age in days is to be considered during measurements²⁴. The diagnostic criteria prepared by Davies et al and Schimichi et al¹⁷ are assumed to be excellent in which pyloric diameter, pyloric length and muscular thickness are taken into account²⁵. For better diagnostic results it is important to place nasogastric tube and suck air and liquid from the stomach. If the case does not conform to diagnostic criteria then its combination with upper gastrointestinal series is expected to greatly improve the diagnosis¹⁷.

CONCLUSION

Ultrasound is the investigation of choice due to its non invasive nature. Pyloric canal length and diameter is more sensitive than the pyloric muscle thickness for ultrasound

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