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TO EVALUATE THE ROLE OF THE DOPPLER SONOGRAPHY AS A SIMPLE AND NON INVASIVE TECHNIQUE FOR EVALUATING INTRARENAL VASCULAR RESISTANCE IN HYDRONEPHROSIS

Dr. Suresh S. Dhakate
Associate Professor, Dept. of Radio Diagnosis, Amaltas Institute of Medical Sciences, Dewas, M.P.

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Corresponding author: Dr. Suresh S. Dhakate
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Abstract

Background & Method: This was a hospital based, time bound, and prospective study, done in the Department of Radio diagnosis of Govt. Medical College, Nagpur, Maharashtra, India with 100 patients. Patients were chosen according to the consideration and the avoidance rules. Two gatherings of the patients were made, one with obstructive one-sided hydronephrosis with or without an enlarged ureter and other one with non-obstructive one-sided hydronephrosis with expanded urinary lot and bladder association.

Result: In obstructive cases increased renal length along with renal cortical thinning were seen in 32 (50%) cases, however decreased renal parenchymal thickness was seen in 48 (75%) cases. Bladder involvement was not seen at all. In nonobstructive cases increased renal length and renal cortical thinning were seen in 14 (36.8%) cases, however decreased renal parenchymal thickness were seen in 18 (47.3%) cases. Bladder involvement along with hydroureter was seen in 33 (86.8%).

Conclusion: The renal doppler ultrasonography should be used as the primary modality of imaging in all suspected cases of unilateral hydronephrosis, in paediatric age group, as it is a simple, non-invasive, non hazardous, cost effective, readily and widely available, less time consuming modality, to reliably distinguish between obstructive and non-obstructive urinary tract dilatation and thereby helping the clinician to plan optimal management strategy.

Keywords: doppler, sonography, vascular & hydronephrosis.

Introduction

Screening of the urinary plot by ultrasonography may start well before the introduction of a child. Adjusted development of the fetus notwithstanding a wide assortment of fetal anomalies can by and by be analyzed by maternal ultrasonography[1]. The widened fetal urinary plot is a finding seen regularly on ultrasound and is related with a wide scope of anticipations. Gentle dilatation of the lot for the most part stays stable after birth or resolves totally. More prominent levels of dilatation are regularly connected with incomplete or complete urinary lot block which may prompt neonatal renal failure[2]. Aspects of the fetal urinary plot can be distinguished as ahead of schedule as 15 weeks incubation. However, the meaning of the renal engineering is as a rule unrealistic until the twentieth week when the obstetrician can evaluate the anteroposterior distance across of the fetal renal pelvis, the measurement of the kidney, and the level of pelvicalyceal dilatation[3]. These boundaries have been related with gestational age. The fetal bladder is also readily seen early in the second trimester [4].

Dilatation of the fetal urinary tract regularly, however not really, envoys obstruction[5]. It is additionally very workable for deterrent to be available without urinary tract dilatation. The ultrasonographic findings consistent with hindrance incorporate fetal bladder augmentation, hydronephrosis and hydroureter with or without dysplastic renal degeneration[6]. Obstructive uropathy can be one-sided or respective and is isolated by anatomical level. Check of the unrivaled urinary plot might be seen sonographically as an enlarged renal pelvis in particular and may connote ureteropelvic intersection deterrent or ureteral atresia.

Material & Method

This was a hospital based, time bound, and prospective study, done in the Department of Radio diagnosis of Govt. Medical College, Nagpur, Maharashtra, India with 100 patients. The duration of this study was from June 2018 to May 2019.

Patients were chosen according to the consideration and the avoidance rules. Two gatherings of the patients were made, one with obstructive one-sided hydronephrosis with or without an enlarged ureter and other one with non-obstructive one-sided hydronephrosis with expanded urinary lot and bladder association.

An itemized history of the patient including, signs and manifestations, pertinent biochemical (RFT) and radiological examinations of the kidneys, were recorded. Renal morphology was assessed in longitudinal, cross over and angled plane (in both side) in every tolerant, utilizing.

Inclusion criteria

The subject of study is age specific. Only neonates, infants and children upto 16 years of age were included in the study.

1. All pre-diagnosed infants and children, with unilateral obstructive hydronephrosis.

2. All infants and children referred to the Department of Radio diagnosis, with strong clinical suspicion of unilateral obstructive hydronephrosis.

Exclusion criteria

1. Patients above 16 years of age.

2. Infants and neonates having bilateral hydronephrosis/ pyonephrosis.

3. Patients having Traumatic or Iatrogenic hydronephrosis.

4. Patients having renal mass lesions.

Results

Table 1: cause of obstructive hydronephrosis

Cause of Obstructive Hydronephrosis	No. of pts.	Percentage %
PUJO	48	75 %
Calculus	08	12.6 %
Ureterocele	06	9.3 %
Ureteric narrowing	02	3.1 %
Total	64	100 %

A total of 64 out of 100 patients were found to have obstructive hydronephrosis. In obstructive cases, PUJO were most commonly seen, 48 (75%) followed by calculus, 08 (12.6 %).

Table 2: USG findings of affected kidney in obstructive hydronephrosis

S. No.	USG findings of affected kidney (in obstructive hydronephrosis)	No of Pts	%
1.	Increased Renal length	32	50 %
2.	Decreased Renal parenchymal thickness	48	75 %
3.	Decreased Renal cortical thickness	32	50 %
4.	Increased AP Diameter of Renal Pelvis	64	100%
5.	Bladder Involvement	02	3.1 %
6.	Presence of Hydrouterer	10	16%

In obstructive cases increased renal length along with renal cortical thinning were seen in 32 (50%) cases, however decreased renal parenchymal thickness was seen in 48 (75%) cases. Bladder involvement was not seen at all.

Table 3: USG findings of affected kidney in nonobstructive hydronephrosis

S. No.	USG findings of affected kidney (in nonobstructive hydronephrosis)	No of Pts	%
1	Increased Renal length	14	36.8 %
2	Decreased Renal Parenchymal thickness	18	47.3%
3.	Decreased Renal Cortical thickness	13	34.2%
4.	Increased AP Diameter of Renal Pelvis	38	100%
5.	Bladder Involvement	38	100%
6.	Presence of Hydroureter	33	86.8%

In nonobstructive cases increased renal length and renal cortical thinning were seen in 14 (36.8%) cases, however decreased renal parenchymal thickness were seen in 18 (47.3%) cases. Bladder involvement along with hydroureter was seen in 33 (86.8%).

Discussion

The data for laterality in obstructive & non obstructive cases, we tracked that in obstructive, the majority of the cases were seen including the left side followed by right side, Lt PUJO – 13 (41%), Rt PUJO 12, (38%) Calculus with equivalent occurrence in right 2, (6%) & left side 2, (6%), ureterocele likewise with equivalent frequency in right 1, (3%) & left in 1 (3%) & Ureteric narrowing in left side 1, (3%). Generally left sided 17 (53%) & right sided 15, (47%) cases[7]. In non obstructive cases the greater part of the cases were found in right side followed by left (Rt VUR 13 (43%), and Lt VUR 9, (30%), neonatal HN with obscure causes right side 1, (3%) , in left side 2, (7%), ureteric duplication right side 3, (10%) left side 0, (0%). Extrarenal pelvis was found in Right 2, (7%), left 0, (0%). In general right sided 19, (63%) and left sided 11, (37%) cases, findings are very much associated with the studies[8].

In obstructive cases expanded renal length alongside renal cortical thinning (RCT <5.9 mm.) was found in 16 (50 %) cases (in those patients who were having extreme evaluation IV hydronephrosis), & and renal parenchymal thickness were found in 24 (75%) cases (in those patients who were having either grade III or evaluation IV hydronephrosis) [9]. Increased AP measurement of renal pelvis (of changing seriousness) was found taking all things together 32 (100 %) cases, hydroureter was seen in just 5 (16%) cases and bladder inclusion was not seen by any means, though in non obstructive cases expanded renal length alongside renal cortical diminishing was seen in less no. of patients for example in 10 (33 %) cases, decreased renal parenchymal thickness were additionally seen in less no. of patients, 15 (half) as contrast with the obstructive cases. Increased AP breadth of renal pelvis was found on the whole 30 (100%) nonobstructive cases though bladder association, alongside hydroureter was found in 28 (93%) cases, not taking all things together 30 patients. 2 instances of extrarenal pelvis showed mild to moderate dilatation of pelvis just without hydroureter and bladder inclusion. These discoveries are as per the past examinations done by Pepe P. Motta L[10] et al.2003-04.

Conclusion

The renal doppler ultrasonography should be used as the primary modality of imaging in all suspected cases of unilateral hydronephrosis, in paediatric age group, as it is a simple, non-invasive, non hazardous, cost effective, readily & widely available, less time consuming modality, to reliably distinguish between obstructive & non-obstructive urinary tract dilatation & helping the clinician to plan optimal management strategy.

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