

## Clinical Outcome of Infants with Antenatally Diagnosed Hydronephrosis And Prognosticating In Relation To The Grade Of Anteroposterior Pelvic Diameter (APPD)

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### Abstract

**Background:** With wide spread use of level 2 and level 3 ultrasounds in third world countries like India antenatally diagnosed dilatation are picked with increased frequency it became imperative to know the outcome of these dilatations.

**Objective:** To evaluate the clinical outcome of infants with antenatally diagnosed hydronephrosis and also to prognosticate data in these children in relation to the grade of APPD [Antero Posterior Pelvic Diameter].

**Methodology:** It was a retrospective study from January 2015 to January 2017, 62 infants were analysed. Post natal scan was done at 3<sup>rd</sup> day of life by radiologist and parameters like grade of hydronephrosis B/L APPD, cortical thickness upper pole, middle pole and lower pole, bilateral ureter size and thickness of bladder after ascertaining that baby is well feed or hydrated and patients were followed as per protocol.

**Results:** A total of 62 infants were diagnosed with antenatal hydronephrosis and depending upon APPD of third trimester was divided into mild, moderate and severe groups. In mild group out of 29 patients only 11 patients had persistent dilatation, in moderate group out of 18 infants 13 had persistent dilatation and in severe group out of 15 infants 13 had persistent dilatation. 40% had Transient Hydronephrosis, 25% had PUJ, 20% had VUR, 6.45% had VUJ, 3.22% had Ureterocoele, 4.83% had MCDK, 2% had PUV. Grade of dilatation increased more chances of UTI which is evident by the chi square value of 9.4602 and significant p value of 0.00825.

**Conclusion:** Infants with any grade of dilatation should undergo ultrasound before discharge from hospital and is especially important for third world country like India where follow up is very poor

**Keywords:** NIL

### Introduction

With the widespread use of prenatal ultrasound antenatal hydronephrosis has become the most commonly picked ultrasound finding<sup>1</sup>, with its incidence ranging from 1 -5% of all pregnancies<sup>2</sup>. If these anomalies are not picked up by prenatal ultrasound (US) and subsequently not managed

properly will manifest later in life as urological abnormalities and sequelae like pyelonephritis, hypertension or renal failure<sup>3</sup>.

The major limitation of the antenatally diagnosed hydronephrosis is that it neither quantifies function or

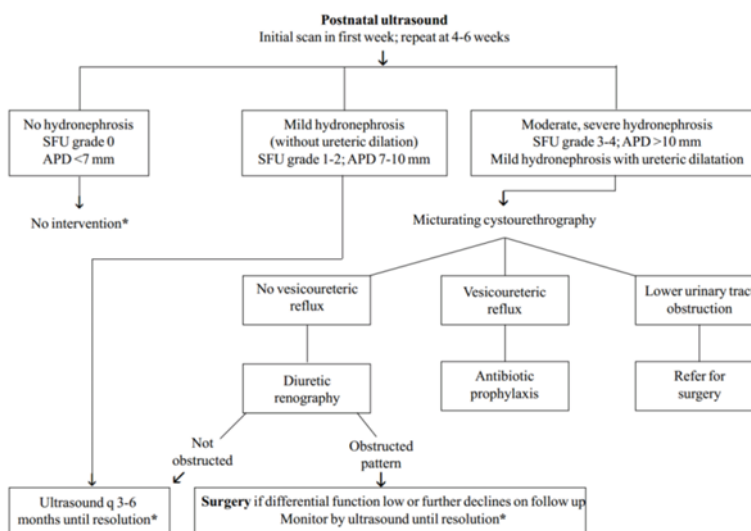
obstruction of an affected kidney<sup>4</sup>. Further recent analysis of literature signifies that patients with mild antenatal hydronephrosis may have a risk of postnatal anomaly, further prospective research is need of hour for optimal management of these children.<sup>5</sup>

This study was aimed at evaluating the clinical outcome of infants with antenatally diagnosed hydronephrosis and also to prognosticate data in these children in relation to the grade of APPD [Antero Posterior Pelvic Diameter].

### Material And Methods

It was a retrospective study from January 2015 to January 2017, 62 infants were analysed. Prenatal US

was done by single radiologist at SKIMS Hospital Soura at third trimester, APPD was defined as mild (5-9.9mm), moderate (10-15mm) and severe (>15mm). Prenatally mothers were referred from various obstetric centers of Kashmir to our pediatric surgery department for opinion and management. Post natal scan was done at 3<sup>rd</sup> day of life by same radiologist and parameters like grade of hydronephrosis B/L APPD, cortical thickness upper pole, middle pole and lower pole, bilateral ureter size and thickness of bladder after ascertaining that baby is well feed or hydrated and patients were followed as per protocol below.<sup>6</sup>



Urine cultures were obtained at monthly follow up visits also it was recommended that urine samples should be collected during any unexplained febrile episode. Urinary tract infection (UTI) was defined as the presence of more than 50000cfu/ml in urine<sup>6</sup> obtained by bag or from a mid stream sample with fever (38.5°cm) and or urinary symptoms. VUR [VesicoUreteric Reflux] was classified into five grades in accordance with international reflux study committee.<sup>7</sup>

Anti-bacterial prophylaxis was given to patients with VUR and those with APPD >10mm and until resolution of reflux UPJO [Uretero Pelvic Junction Obstruction] was defined as presence of isolated APPD associated with an abnormal diuretic renogram pattern. A non-operative treatment was attempted in patients with apparent UPJO, renal units with good function [>40%] and depends upon indices of DTPA.

Andeson Hynes Dismembered Pyeloplasty was performed in symptomatic and split function <40%.

Renal scarring was defined as image showing distortion of renal contour or a complete loss of radioactivity localization monitoring on two tc99DMSA scans performed at an interval of at least six months. MCUG [Micturating Cysto Urethrogram] was done in those patients who had SFU [Society Fetal Urology] grade 3 and 4, APPD >10 or mild hydronephrosis with ureteric dilatation.

### Statistical Analysis:

Statistical analysis was performed using SPSS software [version 22] frequency was used to describe the data. Chi squared test or Fisher’s exact chi square test was used to determine the relationship between grade of hydronephrosis, urinary tract abnormalities, incidence of UTIs and surgical interventions,

frequency of imaging studies and antibiotic prophylaxis,  $p < 0.05$  was considered as statistically significant.

**Results**

This was a prospective study carried from January 2015 to January 2017 with patients referred from various obstetric centers of Kashmir. Most of the abnormalities were detected in late second and third

trimester. A total of 62 infants were diagnosed with antenatal hydronephrosis and depending upon APPD of third trimester were divided into mild, moderate and severe groups. Out of 62 infants 40 [64.51%] were boys and 22 [35.49%]. 44 [70.96%] infants presented with unilateral dilatation while as 18 [29.04%] infants presented with bilateral dilatation. Out of 62 patients 29 were having mild dilatation, 18 had moderate dilatation and 15 had severe dilatation.

**TABLE 1: Grade of dilatation**

Grade of dilatation	Patients	Neonatal confirmation	Percentage
Mild	29	11	37.93%
Moderate	18	13	72.22%
Severe	15	13	86.67%
Total	62	37	59.67%

Table 1 shows in how many patients there was no dilation after birth and these patients were followed for 6 months with two ultrasounds. In mild group out of 29 patients only 11 patients had persistent dilatation, in moderate group out of 18 infants 13 had persistent dilatation and in severe group out of 15 infants 13 had persistent dilatation.

**Table 2: Associated renal and urinary tract anomalies**

Anomalies	Mild [n=29] 9 [31%]	Moderate [n=18] 14 [77%]	Severe [n=15] 14 [99%]	Total 37 [59.67%]	Chi square P value
PUJ	2	8	5	15 [25%]	21.005 <.05
VUR	1	5	6	12 [20%]	
VUJ+MEGA URETER	2	1	1	4 [6.45%]	
URETEROCELE	2	0	0	2 [3.22%]	
MCDK	2	0	1	3 [4.83%]	
PUV	0	0	1	1 [2%]	
TRANSIENT HDN	18	5	2	25 [40%]	

Table 2 shows postnatal diagnosis in infants with antenatal hydronephrosis, 40% had Transient Hydronephrosis, 25% had PUJ, 20% had VUR, 6.45% had VUJ, 3.22% had Ureterocoele, 4.83% had MCDK, 2% had PUV. Out of 29 patients in mild group 9 had anomalies, in moderate group out of 18 patients 14 had anomalies while as in severe group out of 15 patients 14 had anomalies. Chi square value was 21.005 and p value was significant.

Grade of dilatation	MCUG	DTPA	DMSA
Mild [n=29]	05	03	04
Moderate [n=18]	10	09	13
Severe [n=15]	14	10	14
Total	29	22	31

Grade of HDN	PUJ	VUR	PUV	VUJ	MCDK	Uretero-Cele	Total	Chi-Square P Value
Mild [n=29]	0	1	0	0	0	1	02	31.9152 <0.00001
Moderate [n=18]	3	2	0	0	0	0	05	
Severe [n=15]	5	4	1	0	1	0	11	
Total	8	7	1	0	1	1		

Table 4 signifies surgical intervention needed in three groups. In mild group out of 29 infants 2 had surgical intervention; in moderate group out of 18 patients 5 had surgical intervention while as out of 15 in severe group 11 infants had to undergo intervention. In mild group Anderson Hynes pyeloplasty and endo incision of ureteroceles was done, in moderate group 3 infants had to undergo Anderson Hynes pyeloplasty and Ureteric reimplantation in 2, while as in severe group 5 had to undergo Anderson Hynes pyeloplasty, Ureteric reimplantation in 4, PUV fulguration in 1 and nephrouretrectomy in 1. As the grade of dilatation increases need for surgical intervention increases which is evident by chi square of 31.952 and significant p value <0.00001.

Grade of dilatation	UTI	Chi-Square P Value
Mild [n=29]	02 [6.89%]	9.4602 0.00825
Moderate [n=18]	04 [22.22%]	
Severe [n=15]	07 [46.6%]	

Table 5 signifies that as grade of dilatation increases more chances of UTI which is evident by the chi square value of 9.4602 and significant p value of 0.00825

**Discussion**

With wide spread use of level 2 and level 3 ultrasounds in third world countries like India antenatally diagnosed dilatation are picked with

increased frequency it became imperative to know the outcome of these dilatations. In our study 62 infants were included in the study and out of these infants 40 % had transient hydronephrosis followed by PUJ 25 %, VUR 20%, VUJ 10%, Ureteroceles

3.22%, MCDK 4.83% and PUV in 2% which was in accordance with Valent B et al<sup>8</sup> who had transient hydronephrosis in 53.1% followed by PUJ 20.7 %, VUR 14.4%, VUJ 1 %, Ureterocoele 1.4%, MCDK 7% PUV in 1% and extra renal pelvis in 2.%. In our study out of 62 infants 40 [64.51%] were boys and 22 [35.49%] were girls all male patients underwent ritual circumcision. 44 [70.96%] infants presented with unilateral dilatation while as 18 [29.04%] infants presented with bilateral dilatation which was in accordance with Foldi S et al<sup>9</sup> who had 73% males and 27% females which was in accordance with Conkar C et al<sup>10</sup> who had 18.3% unilateral while as 71.7% had bilateral.

In our study, out of 29 patients in mild group 9 [31%] had anomalies, in moderate group out of 18 patients 14 [77%] had anomalies while as in severe group out of 15 patients 14 [99%] had anomalies. chi square value was 21.005 and p value was significant, therefore it clearly signifies that as grade of dilatation increases number of anomalies increases, it was in accordance with Kim HJ et al<sup>11</sup> who had 11 % in mild group, 45% in moderate group and 85 % in severe group, In other study Conkar C et al<sup>10</sup> detected uropathy in 21% of cases in mild group, 54% cases in moderate group and 100% cases in severe group. Thus there is a direct relationship between APPD and postnatal pathologies.

In our study as the grade of dilatation increases frequency of UTI increases ,in mild group out of 29 patients 02 [6.89%] had UTI ,in moderate group out of 18 patients 04 [22.22%] had UTI while as in severe group out of 15 patients 7 [46.6%] had UTI. Thus UTI and APPD has a direct relationship which is evident by Chi Square value of 9.4602 and p value Of 0.00825. These results were in accordance with Coelho GM<sup>12</sup> et al who had cumulative incidence of UTI 39%, 18% and 11% at 36 months of gestation for severe, moderate and mild APPD, respectively.

In our study as the grade of dilatation increases need for surgical intervention increases which is evident by chi square of 31.952 and significant p value <0.00001. In mild group out of 29 infants 2 had surgical intervention, in moderate group out of 18 patients 5 had surgical intervention while as out of 15 in severe group 11 infants had to undergo intervention. In mild group Anderson Hynes pyeloplasty and endo incision of ureterocoele was

done, in moderate group 3 infants had to undergo Anderson Hynes pyeloplasty and Ureteric Reimplantation in 2, while as in severe group 5 had to undergo Anderson Hynes pyeloplasty, Ureteric Reimplantation in 4, PUV fulgaration in 1 and nephrourectomy in 1. These results were in accordance with Valent B et al<sup>8</sup> who had surgery required in 19 [13.2%]: 15 presented with severe and 4 with moderate ANH, similarly Conkar C et al<sup>10</sup> had surgical intervention of 3.1% in mild group, 18.1% in moderate group and 100% in severe group.

## Conclusion

With above results it demonstrates that as the grade of dilatation increases the frequency of UTI. Postnatal urinary abnormalities and surgical intervention increases. Therefore infants with any grade of dilatation should undergo ultra sound before discharge from hospital and is especially important for third world country like India where follow up is very poor. Despite the degree of ANH the gynecologists should refer all infants with ANH to Pediatric surgeon in first week, so that crucial widow time period may be saved and infants will be followed as per protocol designed for the grade of dilatation.

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