

## Original Research Article

# A clinical study on management of hydronephrosis detected antenatally

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### ABSTRACT

**Background:** It is important to detect and manage hydronephrosis early for improved clinical outcomes. The objective of this study is to detect and manage the hydronephrosis which occurs antenatally.

**Methods:** Hospital based cross sectional study was carried out in 20 cases of hydronephrosis in pregnant women as per the inclusion and exclusion criteria laid down for the present study. Patients with mild hydronephrosis were observed. Patients with PUJ obstruction underwent pyeloplasty. Patients with posterior urethral valves underwent cystoscopic dilatation. Patients with VUR were put on prophylactic antibiotic and observed. The patients were followed up post operatively with USG and DTPA scan as indicated.

**Results:** Among the 20 cases with hydronephrosis, majority were males. All cases in terms of side affected were found to be equally distributed. Hydronephrosis was found to be mild in seven (35%) of the cases. Renal dysplasia and bilateral hydronephrosis were found to be the predictors of post natal pathology. Grade 3 and grade 4 were 40% each. There was no persistent case. The most common cause of hydronephrosis was transient hypertension in 5 (33.3%) of the cases.

**Conclusions:** Mild hydronephrosis resolves early and there is no persistence. Renal dysplasia and bilateral hydronephrosis are the important predictors of the post natal hydronephrosis.

**Keywords:** Antenatal, Detection, Hydronephrosis, Management, Outcome

### INTRODUCTION

Hydronephrosis in fetus may be due to transient hydronephrosis, pelviureteric junction obstruction, vesicoureteric reflux, megaureter, multicystic dysplastic kidneys, posterior urethral valves, and others causes are urethral atresia, urogenital sinus, Prune belly syndrome, tumor etc. The potential for progression or equilibrium in hydronephrosis is determined by several physiologic factors like urinary output and flow rates during diuresis, the type and degree of obstruction, Glomerular and tubular renal function, Pelvic compliance.<sup>1</sup>

In hydronephrosis, there is dilatation of the system of the kidney which collects the urine. There is kidney swelling

as well as dilatation in hydronephrosis. In case of swelling of the ureter the condition is called as hydroureter. These two conditions can occur as result of a disease or as a result of physiologic procedure. When there is obstruction due to causes like changes in the functional or structure of the kidney it can result in obstructive hydroureter or obstructive hydronephrosis. The flow of the urine from the kidney to bladder is obstructed or interrupted.<sup>2</sup>

For early detection of the hydronephrosis or hydroureter, USG is considered as method of choice. Hydronephrosis can affect one side of the kidney or both the kidneys also. Hydronephrosis can be acute or it may be chronic in nature. In young adults, the most common cause of

hydronephrosis is presence of calculus in ureter. In elderly cases, the most common causes are benign hypertrophy of prostate or malignancy or pelvic tumors or retroperitoneal tumors.<sup>3</sup>

Hydronephrosis occurring in women with pregnancy is usually physiological. Pelvis of the kidney and ureters get dilated in pregnancy. This can be due to the effect of the progesterone. It can also be due to ureter compression which occurs mechanically. This is considered as normal.<sup>4</sup>

Pain in the flanks, mass in the abdomen, sensation of the vomiting, infection of the urinary tract, vomiting, raised body temperature, increase in the frequency of the urination, increase in the urgency of the urination, pain while passing the urine are some of the common symptoms of the hydronephrosis.<sup>5</sup>

Hydronephrosis diagnosis can be made by kidney USG, abdomen MRI, kidney CT scan or CT scan of the abdomen or by using the IVP. Any method can be used to diagnose the condition of the hydronephrosis.<sup>6</sup>

Present study was carried out to detect and manage the hydronephrosis which occurs antenatally.

## METHODS

A hospital based cross sectional study carried out at Department of Pediatric Surgery and Department of Pediatrics, Karnataka Institute of Medical sciences, Hubli from November 2013 to September 2015.

### Inclusion criteria

- Pregnant women with hydronephrosis detected on ultrasonography
- Willing to participate in the present study.

### Exclusion criteria

- Pregnant women without hydronephrosis
- Not willing to participate in the present study
- Seriously ill pregnant women.

An extensive review of literature was carried out once the topic for the research work was finalized. Based on the review of literature, the proposal of the study was prepared and subsequently it was submitted to the scientific research committee of the Institution. After approval from the scientific research committee of the Institution, the proposal was submitted to the Institutional Ethics Committee. After approval from the Institutional Ethics Committee, the procedure of the study was initiated.

The study questionnaire was pre designed, pre tested, semi structured. During the study period, it was possible to include 20 cases of hydronephrosis in pregnant women

as per the inclusion and exclusion criteria laid down for the present study.

Detailed history was obtained and recorded in the study questionnaire. All pregnant women underwent detailed clinical examination. Routine investigation and ultrasonography was done. They were followed till delivery and at every follow up all the above i.e. history, clinical examination and USG was repeated. All the findings were properly recorded. Patients were admitted if surgery is planned and investigated accordingly. Preoperatively all patients received supportive treatment aimed to correction of general condition of the patient. Physician fitness for surgery was taken in all cases that underwent surgery. Patients with mild hydronephrosis were observed. Patients with PUJ obstruction underwent pyeloplasty. Patients with posterior urethral valves underwent cystoscopic dilatation. Patients with VUR were put on prophylactic antibiotic and observed. The patients were followed up post operatively with USG and DTPA scan as indicated.

### Statistical analysis

The data was entered in the Microsoft Excel worksheet and analyzed using proportions.

## RESULTS

Total number of live births in KIMS from November 2013 to August 2015 was 14918. The incidence of antenatal hydronephrosis was 0.134%.

**Table 1: Sex incidence in the study population.**

Sex	No. of cases	Percentage
Male	17	85
Female	2	10
Undetermined (abortions)	1	5
Total	20	100

Among the 20 cases with hydronephrosis, majority were males i.e. 17 (85%) and only two (10%) were females. One case was aborted and hence sex could not be determined (Table 1).

**Table 2: Side of hydronephrosis.**

Side	No. of cases	Percentage
Left	7	35
Right	6	30
Bilateral	7	35
Total	20	100

All cases in terms of side affected were found to be equally distributed. There were seven cases (35%) where the left side was affected. In six cases (30%) right side was found to be affected. In seven cases both the sides were found to be affected (Table 2).

**Table 3: Severity of antenatal hydronephrosis.**

Grade	No. of cases	Percentage
Mild	7	35
Moderate	6	30
Severe	7	35
Total	20	100

Hydronephrosis was found to be mild in seven (35%) of the cases. In six (30%) of the cases, it was found to be of moderate severity. While in seven (35%) of the cases it was found to be of severe nature (Table 3).

**Table 4: Antenatal predictors of post natal pathology.**

Predictors of postnatal pathology	No. of cases	Percentage
LUTS (oligohydramnios/thick walled bladder)	0	0
Perinephric urinoma	0	0
Renal dysplasia	7	35
Bilateral HN	7	35
Progressive calyceal and ureteric dilatation	0	0

Renal dysplasia and bilateral hydronephrosis were found to be the predictors of post natal pathology. While progressive calyceal and ureteric dilatation, perinephric urinoma, were not found to be the predictors of post natal pathology (Table 4).

**Table 5: Severity of post natal hydronephrosis.**

SFU grade	No. of cases	Percentage
Grade 1	1	6.7
Grade 2	2	13.33
Grade 3	6	40
Grade 4	6	40
Total	15	100

Four patients were not willing for further evaluation. All 15 infants were followed up for 1 year. None had coexisting pathologies. On assessing the severity of the post natal hydronephrosis using the SFU grades, it is found that grade 3 and grade 4 were 40% each. Grade I was the least with only one case (Table 5).

**Table 6: Resolution of mild hydronephrosis.**

Age	No. of cases	Percentage
At birth	2	40
1 month	2	40
6 months	1	20
1 year	0	0
Persistent	0	0

There were five cases of mild hydronephrosis detected during the antenatal period. Out of them 2 (40%) resolved at birth while 2 (40%) took one month to resolve. One

case (20%) resolved after six months of delivery. There was no persistent case (Table 6).

**Table 7: Causes of hydronephrosis.**

Cause	No. of cases	Percentage
Transient HN	5	33.33
PUJ obstruction	3	20
Mega-ureter	1	6.67
VUR	2	13.33
Posterior urethral valve	2	13.33
Cystic disease	2	13.33
Others	0	0

The most common cause of hydronephrosis was transient hypertension in 5 (33.3%) of the cases followed by PUJ obstruction in three cases (20%). VUR, Posterior urethral valve and cystic disease were found to be the cause of hydronephrosis in two (13.3%) of the cases each. One case of hydronephrosis was due to mega ureter (Table 7).

## DISCUSSION

In present study 33.33% of patients with APD of renal pelvis at 3<sup>rd</sup> trimester <10mm had post natal pathology. If cut off was taken at 10mm one case of partial PUJ obstruction and one case of renal cortical cyst would've been missed.

The findings correlate with the previous studies. Patients in present series showed only 2 of the above mentioned predictors and they correlated with post natal pathology.

In present study authors had a case of severe b/I PUJ obstruction. The side which was more severely affected was operated upon first followed 2 months by the other side. Renal functions remained normal following surgery.

Nuraj P et al studied 136 cases and found that majority were males.<sup>7</sup> Authors also found that males were more than females. The mean age of the males was also more than females. Authors did not study the age structure. The author found that the most common cause of hydronephrosis was stone in the kidney while authors found that the most common cause of hydronephrosis was transient hypertension. The authors praised the utility of USG.<sup>7</sup>

Orabi M et al studied 105 cases of hydronephrosis and found that the majority were males.<sup>8</sup> Authors also found that males were more than females. They found that majority were having mild hydronephrosis. Most of them improved. Authors also found that all cases of mild hydronephrosis improved and there was no persistent case of hydronephrosis. The authors concluded that USG done during pregnancy and after delivery is a good tool to detect cases. They also stated that at around 18 weeks of gestation, fetal ultrasound should be done for its anatomy for early detection of antenatal hydronephrosis so that

detected cases can be followed up for improved outcome.<sup>8</sup>

Becker AM et al observed that if the sonogram done after delivery among infants when they are 4-6 weeks old then the rate of detection of abnormalities of the renal system is low.<sup>9</sup> If there is the case of “isolated antenatal hydronephrosis” then there is no indication of routine antibiotics. The authors concluded that if the infants were detected as having abnormal sonogram antenatally then they should be followed up postnatally.<sup>9</sup>

Moorthy I et al studied 425 cases who were having antenatal hydronephrosis during the postnatal follow up over a period of five years.<sup>10</sup> The incidence of infection of the urinary tract was 230 babies. 98.9% was the negative predictive value of the ultrasonogram. The author stressed that careful protocol should be followed for accuracy of the findings of the ultrasonogram. They suggested initiating the antibiotic therapy for all cases of antenatal hydronephrosis.<sup>10</sup>

Aku N et al recommended the guidelines for management based on follow up study of antenatally diagnosed hydronephrosis.<sup>11</sup> 32.94 weeks was the mean gestational age at which diagnosis of antenatal hydronephrosis was made. They were followed for an average period of 26.3 months after the delivery occurred. The most common cause of hydronephrosis was obstruction at uretero-pelvic junction in 62.7% of the cases followed by vesicoreteral reflux in 16.6% of the cases. The authors concluded that even if the ultrasound after the delivery is normal it does not mean that there is no urinary tract abnormality.

Valent-Moric B et al carried out a retrospective study. They found that 53.1% had mild hydronephrosis. 14.4% had vesicoreteral reflux.<sup>12</sup> 12.4% had obstruction at ureteropelvic junction. They observed that as the degree of hydronephrosis increased, the risk increased. 13.2% of the cases required urgent surgery. The author noted that there is need for early detection of antenatal hydronephrosis and these cases must be followed up for appropriate period of time. This statement is in accordance with the conclusion of the present study.

## CONCLUSION

Mild hydronephrosis resolves early and there is no persistence. Renal dysplasia and bilateral hydronephrosis are the important predictors of the post natal hydronephrosis. Hence early diagnosis by ultrasonography of the antenatal hydronephrosis can prevent the occurrence of the post natal hydronephrosis and should be routinely done in all pregnant women. Once detected, should be properly managed to prevent the complications.

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