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Ultrasonographic Evaluation of Foetal Hydronephrosis

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ABSTRACT

Objectives: *Hydronephrosis is commonly detected during routine ultrasound examination of antenatal mothers. There are multiple conflicting prognostic factors in the available literatures with no clear focus on the postnatal outcome. The aim of this study is to assess the outcome of antenatally diagnosed hydronephrosis, based on third trimester antanatal ultrasonography.*

Materials and Methods: *Based on the third trimester fetal ultrasound findings, patients were divided into group I (unilateral hydronephrosis) and group II (bilateral hydronephrosis, ureteric dilatation, bladder wall thickening etc.). Postnatal evaluation and follow-up was performed following a uniform protocol. The outcomes, spontaneous resolution vs. surgical intervention, were compared between groups. These two groups were further subdivided into subgroups on the basis of third trimester ultrasoung findings and further analysis of outcome was carried out.*

Results: *Among a total no of 53 patients in this study group; group I had 39 patients, 5(13%) required surgery; group II had 14 patients, 4(28%) required surgery. The difference in outcome between the groups was statistically significant (p=0.01). Among those with unilateral hydronephrosis, none(0/39) with renal anteroposterior pelvic diameter (APD) <15 mm required surgery, while 2 out of 2 patients(2/2) with fetal APD >30 mm required surgery. In those with APD between 15-30 mm, 3 out of 8 (3/8) required surgery and prolonged follow-up was required to arrive at the decision. The difference in outcome between the subgroups was statistically significant (p=0.001, Chi-square test). Group II had two subgroups. Subgroup I consisted of patients with APD < 15 mm with or without ureteric dilatation and bladder wall thickening , whereas subgroup II consisted of cases with APD >/= 15 mm with or without ureteric dilatation and bladder wall thickening. Of 10 cases in subgroup I, 1 (1/10) needed surgical intervention and 3 out of 4 cases (3/4) of subgroup II, needed surgery. The difference in outcome between these two groups was statistically significant (p=0.002, Chi-square test).*

Conclusions: *The results of our study show that simple unilateral fetal hydronephrosis runs a benign course. In the presence of hydronephrosis larger than 15 mm, bilateral disease or ureteric dilatation, detailed postnatal evaluation and regular follow-up is warranted to plan a timely intervention.*

Keywords: *Hydronephrosis, Antenatal ultrasonography, Anteroposterior pelvic diameter.*

INTRODUCTION

Dilatation of the fetal renal collecting system, antenatal hydronephrosis (ANH), is one of the most common abnormalities detected on prenatal ultrasonography (US),reported in approximately 1-5% of all pregnancies. Not all hydronephrosis on prenatal US represent pathology; many are transient and have no clinical significance. The dilemma therefore is to distinguish children who require follow up and intervention from those who do not. While the use of prenatal US as a screening tool for identifying urological anomalies has not been shown to improve postnatal outcomes, more patients are undergoing prenatal counseling for the discovery of ANH [1]. Consequently, the diagnosis of ANH may cause significant parental anxiety and physician uncertainty when it comes to pre and postnatal management. In addition, because its evaluation can be quite extensive, the management of ANH has a significant cost impact on our current healthcare system. Concerns over litigation due to failure to diagnose an anomaly may also shape the postnatal evaluation. Foetal kidneys can be well visualized by US at the 12-13th week, with distinct renal architecture seen by the 20th week. From the 12th week to the 40th week, the renal length increases from 1.0 to 2.7 cm, APD from 0.8 to 2.6 cm, and transverse diameter from 0.9 to 2.6 cm [2].

DEFINING ANH: The measurement of the APD of the renal pelvis as visualized in the transverse plane is most studied parameter for assessing ANH in utero. A simple threshold AP value which separates normal from abnormal does not exist, as even severe cases of ANH have the potential to resolve without incident while mild degrees of ANH have the potential to progress [3]. Potential factors affecting APD include gestational age, hydration status of the mother and the degree of bladder distention. Since the dimensions of the renal pelvis may normally increase with gestational age, most investigators have adjusted threshold APD values for early and later gestational age and varying the minimal APD threshold for normal can significantly alter the positive predictive value of APD as a measure of ANH and postnatal pathology [Table1].

Table1 True positive (TP) and positive predictive value(PPV) of urological pathology based upon ANH.

Reference	No of patients	APD(mm)	%ANH	%TP	%PPV
Economou1994	6645	2-3	1.96	0.04	2.3
Persutt 1997	5529	4	5.50	0.50	9.2
Morin 1996	5900	4	2.20	0.08	2.9
Owen 1996	3804	5	0.80	0.30	40
Langer 1996	2170	5	4.40	0.60	14
Livera 1989	3521	5	0.85	0.17	20
Rosendahl1990	4586	10	0.39	0.28	77
Johnson 1992	7502	10	0.37	0.16	43
Gunn 1988	3228	15	1.92	0.22	11

GRADING SYSTEM: A more objective measure of the degree of hydronephrosis is APD. There is near uniform agreement that an APD greater than 15 mm represents severe or significant hydronephrosis, and most would agree that a value of 4-5 mm is an appropriate threshold for considering the APD to be abnormal [4,5].With this in mind, ANH can be classified in the 2nd and 3rd trimester using APD thresholds for which the best available evidence provides prognostic information (Table2).

Table2- definition of ANH by APD

Degree of ANH	Second trimester	Third trimester
Mild	4 to <7 mm	7 to <9 mm
Moderate	7 to 10 mm	9 to <15 mm
Severe	>10 mm	15 mm or more

PREDICTIVE VALUE OF APD-DEFINED ANH FOR PATHOLOGY: An association between increasing incidence of postnatal pathology and degree of hydronephrosis holds true for most diagnoses. Key exceptions to this

trend include VUR and distal ureteral obstruction. The incidence of VUR between groups of children with mild, moderate, and severe ANH is not significantly different (p=0.10) [5]. Furthermore, the reported incidence of VUR in children with ANH may not be appreciably different from the general population. This implies that the presence or severity of ANH may have no reflection upon the presence of VUR, and further relies the efficacy of renal US in screening for VUR. Distal ureteral obstruction becomes more likely as the ANH increases from mild to moderate; however, there is a slight decrease in likelihood in the severe category. This may reflect the preponderance of type I and II megaureters, which can have significant ureteral dilatation with fewer renal pelvic effects [6]. Rather than relying on a single antenatal study to determine postnatal pathology, additional examinations are often used to help identify fetuses at higher risk. Many investigators report the use of repeat examinations periodically during the antenatal period [5]. At least one retrospective investigation suggested that a second US later in the pregnancy that has stable or reduced moderate ANH (APD < 10) near uniformly predicts eventual resolution without surgical intervention [7]. Additional prospective investigations into the prognostic value of repeated prenatal measures of APD may prove useful in reducing the need for postnatal evaluation.

TRANSIENT HYDRONEPHROSIS: Most children with an antenatal history of renal pelvis and calyceal dilation ultimately resolve their hydronephrosis. The etiology of this finding may be related to a narrowing of the ureteropelvic junction (UPJ) or natural kinks and folds that occur early in development that resolve as the patient matures. The differentiation of transient hydronephrosis versus clinically significant UPJ obstruction remains one of the most controversial challenges in modern pediatric urology. Neverth-eless, the incidence of transient hydronephrosis ranges from 41 to 88% [1]. Most children with a pelvic dilatation less than 6 mm diagnosed during the 2nd trimester or less than 8 mm diagnosed during the 3rd trimester have transient hydronephrosis [1]. In contrast, the incidence of transient hydronephrosis is only 40% in children with an APD less than 10-12 mm detected during the 3rd trimester.

UPJ OBSTRUCTION: The finding of pelvicalyceal dilatation without ureteral dilatation, commonly unilateral, is highly suggestive of UPJ obstruction [8]. The differences in the management of these children vary from early surgery to close observation until renal function deterioration or progression of hydronephrosis occurs.

VESICOURETERIC REFLUX : The finding of a variable degree of hydronephrosis or hydroureteronephrosis may suggest the possibility of VUR; however, no reliable findings definitively diagnose reflux on fetal US [9]. The incidence of reflux appears to increase with the degree of sonographic dilatation in post-natal period; however, the degree of dilatation does not correlate with the grade of VUR.

URETEROVESICAL JUNCTION OBSTRUC-TION/MEGAURETERS: The combination of prenatal hydronephrosis and ureteral dilation and a normal bladder suggests a megaureter. Megaureters can be refluxing, obstructed, non-refluxing/ non-obstructed, and refluxing/ obstructed. Prenatal ultra-sonography has lead to more frequent postnatal diagnosis of primary megaureters.

MULTICYCTIC DYSPLASTIC KIDNE: The presence of multiple, non-communicating cysts of various sizes and no evidence of identifiable renal parenchyma is characteristic of an MCDK. Most patients are identified prenatally after 16 weeks of gestation. In some patients, MCDK may be confused with UPJ obstruction. In children with ANH, the reported incidence of MCDK is approximately 4-6%.

POSTERIOR URETHRAL VALVES/URE-THRAL ATRSIA: The identification of: 1) prenatal hydronephrosis (often bilateral); 2) dilated, thick-walled bladder that fails to empty;

3) dilated posterior urethra; and 4) decreased amniotic fluid suggests the presence of lower urinary tract obstruction (LUTO).Unlike the unilateral upper tract dilation found commonly on prenatal ultrasonography, LUTO carries a worse prognosis with increase mortality and morbidity due to pulmonary hypoplasia and renal damage. The incidence of LUTO ranges from 1 in 2000-25,000 live births.

URETEROCELE/DUPLEX SYSTEM/ECTOPIC URETER: The finding of upper pole hydroureteronephrosis with a thin-walled cystic structure in the base of the bladder is suggestive of the diagnosis of a ureterocele , while the same finding without an associated intravesical cystic structure is suggestive of an ectopic ureter. These two etiologies of ANH are commonly associated with a duplex system. Although the pathology is easily suspected prenatally, postnatal work up, including a voiding cystourethrogram (VCUG) and possible renal scan, is required to clearly define the anatomy and to guide further management.

Other more infrequent conditions presenting with prenatal hydronephrosis include prune belly syndrome, cystic kidney disease, congenital ureteric strictures, and megalourethra. Unlike the other causes of ANH, these are uncommon.

Postnatal radiological evaluation of ANH : The initial postnatal evaluation of fetal hydronephrosis depends in part on the degree of hydronephrosis seen during fetal evaluation. Currently, no distinguishing features exist that differentiate which of these children will develop progressive evidence of obstruction on subsequent postnatal follow up. One of the most important distinctions in the assessment of these children is determining which patients benefit from surgery. This distinction is important since unnecessary intervention exposes patients needlessly to the morbidity of surgery, while inappropriate observation places patients at risk of infection and renal parenchymal loss. Regardless, except in the most severe cases, most urologists will initially follow hydronephrotic kidneys with serial radiological exams and use decreasing differential renal function or worsening hydronephrosis as an indicator that surgery or advanced imaging may be required.

Follow- up evaluation of ANH: Numerous studies have demonstrated that a single normal US within the first week of life is not adequate to verify absence of obstruction. A second US is recommended at 1 month of age as initial follow-up testing. The incidence of late worsening or recurrent hydronephrosis is approximately 1-5%, with this risk applying to all grades of initial hydronephrosis. When there is late worsening or recurrence, the severity of hydronephrosis is quite significant, being of grade III/IV, and the majority of the patients are likely to be symptomatic [10]. The timing of late worsening or recurrence has been observed to range from a few months to 5-6 years [11]. Consequently, long term follow up is recommended, but the appropriate length of surveillance has yet to be determined. It also remains to be determined whether such follow up is warranted and cost-effective given the low incidence of late-occurring significant obstruction. Consequently, some practitioners have recommended discharging children with mild or grade I/II hydronephrosis on the 1-month US from further surveillance with the recommendation of seeing the child again for UTI or pain, while others have recommended serial US and UTI surveillance every 6 or 12 months or in 2-3 years. Future prospective studies will be needed to determine the most cost-effective and clinically appropriate follow-up protocol for children with ANH.

OBJECTIVES OF THE SUDY

1. To know the postnatal outcome of the baby who has been diagnosed to have hydronephrosis during antenatal period.
2. To find out the cut off of renal pelviectasis below which no complications are detected in postnatal life.

MATERIALS AND METHODS

It is a prospective study. This study was conducted on pregnant ladies who were admitted in the department of Obstetrics and Gynecology and came for evaluation of fetal well being to the department of Radiodiagnosis between January 2013 to May 2014.

Sample size - 1204 antenatal mothers coming for routine third trimester ultrasonography during the study period. 53 of them showing ANH are included in this study.

All the patients were ultrasonologically examined with 5.2 MHz transducer in obstetrical mode using the same protocol in Acuson 300 premium ultrasound machine.

All the antenatal mothers coming for routine ultrasonography to the department of Radiodiagnosis during January 2013 to May 2014 were assessed between 34 to 36 weeks of gestation for the presence of fetal hydronephrosis by ultrasonographic measurement of the antero-posterior renal pelvic diameter (APRPD). An APRPD measuring > 7mm was considered for further follow up study. Patients were followed up from third trimester of pregnancy to a variable period (at least 6 months) after birth. All ultrasonograms were performed using a uniform protocol. On the basis of third trimester fetal ultrasonographic examination findings, patients were divided into group I (unilateral hydronephrosis) and group II (bilateral hydronephrosis or bladder wall thickening and/or ureteric dilatation). Based on the existing literature, group I was further divided into three subgroups depending on the 34-36 week fetal pelvic anteroposterior diameter (APD) : <15 mm, 15-30 mm, and > 30 mm. Group II was further divided into two subgroups. Subgoup I consisted of both kidneys' involvement with pelvic APD < 15 mm with or without ureteric dilatation or bladder wall thickening. Subgroup II consisted of group of patients with pelvic APD > or = 15 mm with or without ureteric dilatation or bladder wall thickening. Postnatal renal status was assessed by ultrasonographic examination of the baby between 2 to 6 weeks of post natal life and further follow up study was conducted between 5 to 6 months of postnatal life. Postnatal evaluation was uniformly done and the decision for intervention was made by the pediatric surgery department of our medical college hospital. A diagnosis of transient hydronephrosis was made when hydronephrosis resolved on the first or subsequent postnatal evaluations. The outcomes, spontaneous resolution vs. surgical intervention, were compared between groups.

Statistical Analysis: Statistical analysis was done using the software SPSS. Quntitative variables were expressed as mean +/_ standard deviation, and comparisions were performed using independent *t* test. Chi-square test/ Fisher's exact test and Mann-Whitney test were used to compare the categorical variables between groups. The level of significance was set at 0.05. Power of the study was set at > or =0.80.

RESULTS

Present study demonstrates the outcome of the group of patients who have been diagnosed to have fetal hydronephrosis during third trimester ultrasonographic examination. All antenatal mothers coming to our department for the routine third trimester ultrasonographic examination with fetal hydronephrosis (APRPD>7 mm) were included in this study. A total number of 53 patients were diagnosed to have antenatal hydronephrosis.

Group I had 39 cases . Of these 39 cases of group I 34 cases were found to have spontaneous resolution of hydronephrosis (87%) and only 5 (13%) needed surgery. Group II had 14 cases and out of these, only 4 (28%) needed surgery, rest of the 10 patients (72%) underwent spontaneous resolution (Table 3.).

Table 3: Comparision of outcomes between two groups

Patient groups	Group I	Group II	*P*- Value
Spontaneous Resolution	34(87%)	10(72%)	0.01
Needed Surgery	5(13%)	4(28%)	
Total No	39	14	

p- Value was calculated using Fisher's exact Test

The difference in outcome between the two groups was found to be statistically significant (p=0.01, Fisher's exact test).

Table 4 summarizes the subgroups of group I. All patients (2/2) with renal APRPD >30 mm required surgery. None (0/29) of the patients with APRPD < 15 mm required surgery. In those with APRPD between 15-30 mm 3 out of 8 cases(3/8) needed surgery and prolonged follow-up was reqiured to arrive at the decision. The difference in outcome between subgroups was found to be statistically significant (p<0.001, Chi-square test).

Table 4: Comparision of outcome among subgroups of group I

APRPD<15 MM			APRPD 15-30 mm			APRPD >30 mm			*p*-Value
Total No	SR	NS	Total No	SR	NS	Total No	SR	NS	
29	29	0	8	5	3	2	0	2	<0.001

p- Value was calculated using Chi-Square test
Abbreviations: SR-Spontaneous Resolution NS- Needed Surgery

Group II patients were divided into two subgroups I and II. Of 10 cases in subgroup I, surgery was needed only in 1 case (10%) and in subgroup II, 3 out of 4 cases (75%) had to undergo surgery. The difference in outcome between these two subgroups was found to be statistically significant (p<0.002, Chi-square test). These difference in outcome has been depicted in Table 5

Table 5: Comparision of outcome in subgroups of Group II.

Outcome	Subgroup I	Subgroup II	*p*-Value
SR	9	1	<0.002
NS	1	3	

p- Value was calculated using Chi-square test.
SR- Spontaneous Resolution NS-Needed surgery

Of these 53 cases of antenatal hydronephrosis, 1 was associated with diaphragmatic hernia, 1 was associated with placenta previa and 1 was associated with Fetal growth retardation. All these three cases underwent spontaneous resolution. Thus no singnificant association of the above mentioned conditions with fetal hydronephrosis was established (p> 0.05). Of 53 cases 1 was twin pregnancy with hydronephrosis in fetus B and this case also underwent spontaneous resolution.

None of the cases in the present study was found to have oligohydramnios.

In relation to our second objective we compared the outcome of the cases between group I and group II having antenatal hydronephrosis with APD < 15 mm. Group I had 29 cases with APD<15 mm and all of them underwent spontaneous resolution. Group II had 10 cases with APD <15 mm. Of these 10 cases of group II, only 1 patient had to undergo surgical intervention and rest of the cases were found to have spontaneous resolution after follow up for varying period of time. The difference of outcome between the two groups was found to have insignificant (p=0.6). The difference in outcome between these two groups have been depicted in Table 6.

Table 6. Difference in outcome between two groups with antenatal APH <15 mm

Outcome	Group I(APD<15 mm)	Group II (APD<15 mm)	*P*- Value
SR	29	9	0.6
NS	0	1	

p- value was calculated using Chi- square test.

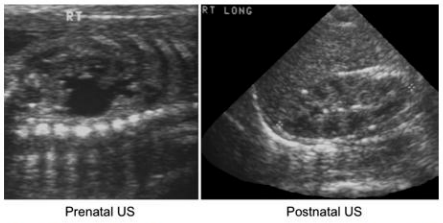

Figure 4 Transient hydronephrosis in the right kidney as seen on the prenatal US that resolved completely by the first postnatal US.

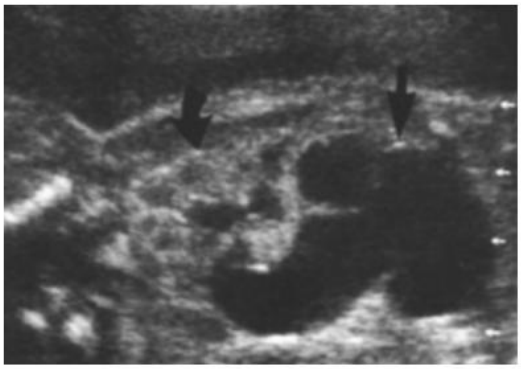

Figure 7 The appearance of a UVJ obstruction on the prenatal US. Note the kidney is minimally dilated (thick arrow) while there is significant dilation of the ureter (thin arrow).

DISCUSSION

With the advent of routine obstetric ultrasound, a vast majority of renal anomalies are picked up on antenatal ultrasound. The incidence of antenatal diagnosis of hydronephrosis is as high as 1-5% [12]. Our study has revealed that the incidence of antenatal hydronephrosis is 4.4%.Antenatal diagnosis of hydronephrosis causes significant distress to the parents during pregnancy. For a treating physician, in addition to the etiology, it is also essential to know the natural history of the disease. On the other hand, for the parents, obstetricians, pediatricians, and urologists who are involved in the antenatal counselling, it would be easy if the fetal hydronephrosis outcomes are explained in a clear and simple way based on the sonographific findings rather than the potential differential diagnoses.

Lee et al., [13] in their meta analysis on the outcome of antenatal hydronephrosis, have concluded that children with any degree of antenatal hydronephrosis are at a greater risk of postnatal pathology compared to normal population. However, they could not use a single fetal ultrasound criterion as a predicting factor due to lack of conformity in reporting. Mallik and Watson [14] reported a trend towards larger renal pelvic APD on third trimester scans being associated with more significant pathology, but cautioned a lot of clinical overlap and highlighted the need for a cautions antenatal counselling. The existing literature does not provide a clear picture on clinical relevance of detecting fetal hydronephrosis and its value in predicting postnatal outcome.

Studies on outcome of fetal hydronephrosis could be complex with overlapping of multiple diagnoses. Although we did not encounter patients with bilateral pelviureteric junction (PUJ) or multiple pathologies such as vesicoureteral reflux (VUR) and PUJ in the same patient, these are likely to complicate outcome assessment. In addition, observer variation between sonologists and lack of uniform protocol or multiple surgeons deciding for surgical intervention could bias the results. We acknowledge that our numbers are small, however, they could act as a pilot study for a larger well-planned study.

The outcome in the group with antenatally detected mild hydronephrosis in this study was excellent, with majority of patients demonstrating spontaneous resolution either antenatally or postnatally. These reassuring results highlight the benign nature of mild hydronephrosis diagnosed in the antenatal period. Mild hydronephrosis may be an expression of the physiological changes associated with normal growth and development of the fetal renal pelvis. Fetuses with moderate/severe hydronephrosis, however, had poorer postnatal prognosis and needed regular

infant follow up. In order to identify the fetuses who will really benefit from intrauterine urinary diversions, the selection criteria was refined. This is based on amniotic liquid quantification (amniotic liquid index measured by ultrasonography), karyotype study and fetal urine electrolytes and protein dosage [15]. The serial evaluation of fetal urine has been postulated for allowing a better accurate selection of fetus who will benefit from urinary diversion [13]. The addition of new fetal renal function prognostic markers has aided urinary investigation. The α1 microglobulin, the growth transformation-β1 factor and the epidermic growth factor are some of them [9]. In the present study, we observed that proteinuria as demonstrated by β2 microglobulin dosage has been a bad prognosis indicator, mainly when associated with elevated concentration of sodium and chlorine in the fetal urine.

Early hydronephrosis identification allows the screening of fetuses with indication of prenatal intervention, delivery anticipation, or anticipated removal to a specialized medical service. Besides being important to family counseling, it allows better parents' orientation and preparation to the diagnosis and eventual pre- or postnatal intervention. Early perinatal medical follow-up of patients with hydronephrosis avoid urinary tract infections in newborns at risk, decrease hospitalizations due to infections or electrolytic dysfunction, and enable the substitution of urgent for elective surgeries.

Many parameters aid in the ultrasonographic diagnosis of fetal hydronephrosis. The anteroposterior diameter of the renal pelvis is considered the most simple and sensitive. Corteville et al. [16] believe that a pelvis diameter ≥ 4 mm and ≥ 7 mm before and after the 30th week of pregnancy, respectively, are associated with high diagnostic sensitivity. Even though their data are consistent, it is still controversial if the degree of dilatation at birth can predict postnatal hydronephrosis development.

Antenatal intervention is still not a consensus in fetal hydronephrosis approach, especially regarding nephro and vesicoamniotic diversions with the purpose of preserving postnatal renal function. The last 10 years are characterized by the refinement in fetal therapy. The treatment philosophy defined the prevention of lung hypoplasia as the primary purpose, being secondary the effects on renal and vesical function. The most common causes of fetal hydronephrosis are transitory non-obstructive factors such as the physiologic dilatation.

The ureteopelvic junction anomaly is the main cause of neonatal hydronephrosis. It occurs mainly because of abnormal distribution of collagenous and muscular fibers in this region. It is more common in males, being bilateral in 21 to 36% of the cases [17]. In our study we also found that the condition was more commonly associated with male babies. In our study, the surgical intervention was performed only in those patients who presented ob- structive DTPA with low initial relative tubular renal function (< 40%), significant decrease (≥ 10%) during follow-up, outbreak of new scars or recurrent urinary tract infection.

Vesicoureteric reflux is more common in boys, there is higher incidence of bilateral onset, and the reflux grade is more severe [18]. It is possible that such characteristics are secondary to high intravesical pressures, due to late maturation of the striate urethral sphincter in boys, as described by Kokoua et al. The impact of prenatal diagnosis in the vesicoureteral reflux outcome is still not known. Due to the frequent spontaneous resolution of early diagnosed reflux, our approach has been conservative, with clinical surveillance, antibiotics prophylaxis and selected tests for renal evaluation. Ureterovesical junction anomalies characterize the megaureter in its different forms Spontaneous improvement of the megaureter is a common event. Prenatal diagnosis allows early follow-up and identification of some patients who can develop renal function deterioration, despite the absence of symptoms [19]. In the present study only one patient was found to have ureteric dilatation and the patient had to undergo surgery.

The posterior urethral valve is the most common cause of infravesical obstruction in boys, with an incidence of 1 in 4,000 to 25,000 children born alive [20]. The presence of a fetus with thick bladder wall, bilateral hydronephrosis, with or without renal dysplasia, and oligoamnios strongly suggests the prenatal diagnosis of posterior urethral valve. We can conclude that the prenatal diagnosis of hydronephrosis allows perinatal follow-up which results in an appropriate posnatal management, especially in patients with hydronephrosis. As a consequence, it helps in the selection of patients who will eventually need early surgical intervention.

Studies on outcome of fetal hydronephrosis could be complex with overlapping of multiple diagnoses. Although we did not encounter patients with bilateral pelviureteric junction (PUJ) or multiple pathologies such as vesicoureteral reflux (VUR) and PUJ in the same patient, these are likely to complicate outcome assessment. In addition, observer variation between sonologists and lack of uniform protocol or multiple surgeons deciding for surgical intervention could bias the results.

The results of our study showed that simple unilateral hydronephrosis, detected prenatally, runs a benign course. The chances of spontaneous resolution are high, especially when the third trimester fetal pelvic APD is less than 15 mm. These data could be used in counselling parents of such foetuses favorably. On the other hand, in the presence of hydronephrosis 15 mm or more, bilateral disease, ureteric dilatation or bladder distension on prenatal ultrasound, detailed evaluation and prolonged follow- up is warranted to decide on a timely intervention.

CONCLUSION

A total number of 53 patients were diagnosed to have antenatal hydronephrosis during routine third trimester ultrasonography. Postnatal follow-up study was also conducted in those patients for a variable period of time.

The results of our study showed that simple unilateral hydronephrosis, detected prenatally, runs a benign course. The chances of spontaneous resolution are high, especially when the third trimester fetal pelvic APD is less than 15 mm. These data could be used in counselling parents of such fetuses favourably. On the other hand, in the presence of hydronephrosis >15 mm, bilateral disease, ureteric dilatation or bladder distension on prenatal ultrasound, detailed evaluation and prolonged follow-up is warranted to decide on a timely intervention. Larger prospective studies with well defined prenatal screening protocols and uniform postnatal follow-up are warranted to address the outcome of fetal hydronephrosis.

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