Prenatal sonographic evaluation and postnatal outcome of renal anomalies

Manisha Kumar, Usha Gupta, Seema Thakur\(^2\), Shilpi Aggrawal\(^1\), Jyoti Meena, Sumedha Sharma, Shubha S. Trivedi

Departments of Obstetrics and Gynecology, and \(^1\)Pathology, Lady Hardinge Medical College, New Delhi, \(^2\)Department of Genetics, Fortis La Femme Hospital, India

OBJECTIVE: To determine the prognosis of antenatally detected renal anomalies by sonographic evaluation.

MATERIALS AND METHODS: This was a follow-up study of all antenatally detected renal anomalies from January 2008 to Dec 2009 referred to fetal medicine clinic. Prenatal evaluation was done and cases were divided into four groups depending upon their prenatal sonographic findings. Post natal follow-up was done up to one year in cases of live babies. Autopsy was carried out in still born fetus after consent.

RESULTS: The renal anomaly was detected in 55 cases, which were fully followed. The prognosis was said to be poor for group I cases with gross extra renal anomaly along with the renal anomaly, and for group II in which there was organic renal pathology with loss of renal function suggested by non-visualization of bladder and almost absent liquor. Prognosis was guarded and depended upon the gestational age of presentation in group III, which had obstructive uropathy; prognosis was good in group IV cases, which were mild, unilateral or which presented late.

CONCLUSION: Prenatal sonographic evaluation gives reasonably accurate picture of the prognosis and can be very helpful in counseling the parents regarding prognosis and help in deciding the timing and route of delivery.

Key words: Postnatal outcome, prenatal diagnosis, prognosis, renal anomaly

Introduction

Ultrasonography has become a standard part of prenatal care. Around one percent of the scan will reveal fetal anomaly. Whenever such an anomaly is diagnosed it is the duty of the caregiver to provide accurate information about the findings as quickly as possible.

Urinary tract abnormalities account for 15-20% of all congenital anomalies.\(^1,2\) Although prenatal diagnosis of urinary tract anomalies is relatively easy (detection rate of 89%) based on sonographic images corresponding to dilated urinary tract, using the sonographic finding to provide prognostic counseling to the couple is a difficult task. Counseling regarding prognosis becomes a dilemma for obstetricians and pediatric nephrologists and urologists more so as many anomalies may be manifested late in the second trimester. Data on antenatal diagnosis and post-natal follow-up is important for assessing prognosis and hence counseling of parents.

There are many published studies evaluating the use of fetal urinary metabolites in prospectively predicting postnatal renal function; however, a recently published systematic review evaluating the diagnostic ability of fetal urinary analytes to predict outcome concluded that there was insufficient evidence to commend such investigation.\(^3\) There is conflicting data on ultrasound finding in predicting outcome. Previous papers have reported that early gestational age at diagnosis by USG, renal parenchymal cystic appearance and echogenicity, and severe oligohydramnios are associated with good predictive accuracy.\(^4,5\) However no consensus exists...
on most specific ultrasound parameter or combination of features that prospectively predict postnatal renal function. This may be because of heterogeneity of previous studies or may be due to retrospective study design of previous studies.

The objective of the study was to do prenatal sonographic evaluation regarding renal function impairment after diagnosis and to provide prognostic counseling accordingly. Postnatal correlation was done in all cases in order to see the accuracy of prognostic counseling. The outcome of the study was to provide better counseling for women and families dealing with prenatally diagnosed renal anomalies.

Material and Methods

It was a prospective study. All patients with prenatally detected renal malformation by ultrasound referred to the fetal medicine OPD for first 2 years of the 3-year study period (Jan 2008 - Dec 2010) were included. After diagnosis women underwent targeted scanning for appropriate counseling regarding prognosis, ultrasound was done especially with respect to rule out other congenital malformations, to see the renal involvement whether unilateral or bilateral, the amount of liquor, bladder visualization and cortical differentiation. A follow-up scan was done to observe the evolution of the anomaly. Fetal echocardiography was also done. Relevant maternal investigations were done.

In women with gestation less than 20 weeks having gross renal anomaly in fetus, termination was offered. In gestation more than 20 weeks, pediatric surgery referral was taken. Counseling by geneticist was done, depending upon the prenatal evaluation findings. All the cases were divided into 4 groups. The fetuses with suspected major extra renal malformations along with renal malformation were grouped as Group I. In cases with bilateral renal malformation, we looked for sonographic findings suggesting functioning kidneys by seeing the amount of liquor and visualization of bladder, if the cases had oligohydramnios and non-visualization of bladder showing poorly functioning kidney, they were grouped as group II. Group III constituted those fetuses with bilateral renal malformation, oligohydramnios but bladder seen with or without presence of corticomedullary differentiation. In group IV were fetuses with unilateral or mild bilateral renal affection, shown by corticomedullary differentiation present, with slightly decreased or normal liquor, bladder was visualized. Termination was offered in group I and group II women between 21 and 24 weeks having lethal syndromic etiology as the prognosis was poor. Rest cases were followed at regular intervals (USG every 2-3 weekly) to detect the course of the disease.

Postnatal follow-up was done to see the accuracy of the prenatal evaluation. The cases in which there was stillbirth or termination of pregnancy, fetal autopsy was done according to the routinely followed protocol. All post-mortem examinations were carried out with written consent. This included a photograph, X-ray of fetus (AP and lateral), external and internal examination including histopathological examination of the kidneys and other viscera. The chromosomal analysis was done whenever fetal sample was available and the parents gave consent. All live born babies underwent ultrasound within 3-5 days of birth and renal function tests were done. The babies were followed up after 1 month, 6 months and one year, 2 years after delivery; minimum period of follow-up was one year.

Results

Out of 24,160 deliveries, there were 422 cases (1.8%) with gross congenital anomaly registered in the study period; there were 63 cases with renal anomaly (14.9%). There were 8 cases, which were lost to follow-up and total 55 cases were fully followed up. Diagnosis was done at less than 20 weeks (mean 19 weeks) in 9 cases (16.4%), Termination of pregnancy was offered in them as the anomaly was severe. Fetal autopsy was done after termination of pregnancy in 8 cases, and diagnosis was confirmed in all of them [Table 1].

There were 46 cases in which diagnosis was done after 20 weeks (83.6%), after targeted scan women were divided into groups according to the findings on prenatal evaluation. The women in group I (11 cases) had suspected gross extra renal malformations; the mean gestational age was 31weeks. They were counseled
regarding poor prognosis in view of the findings. Termination was offered in 4 cases, which had suspected lethal syndromic etiology and who presented before 24 weeks [Figures 1 and 2]. There were 3 live births, all of them died within hours to 2 days after delivery. Autopsy was done in 9 cases. Lower segment cesarean section (LSCS) was done in 3 cases for maternal indication only (one case each of placenta previa, previous 2 LSCS and transverse lie) [Table 2].

The women who belonged to group II were also counseled that the prognosis was poor as the renal function seemed to be impaired as bladder was not seen and liquor was reduced. There were 13 cases in this group, mainly cases with bilateral cystic kidneys; mean gestational age was 27 weeks. There were 5 live births, but all of them died within days of delivery, one survived till 3 months and then succumbed to renal failure [Table 3]. LSCS was done in one case for fetal distress (case no 27). The baby later died after 2 days due to respiratory distress and renal failure. Autopsy was done

Table 1: Fetus with renal malformation detected at less than 20 weeks

| Case no. | Ultrasound findings | Gestation | Autopsy | Diagnosis |
|----------|---------------------|-----------|----------|-----------|
| 1        | Liquor almost nil, kidneys and bladder not visualized | 18        | Bilateral renal agenesis | Bilateral renal agenesis |
| 2        | Bilateral multicystic, size 2 mm to 4 mm, oligohydramnios | 19        | Bilateral kidney absent right lower limb mesomelia, polydactyly | Bilateral renal agenesis with limb defect |
| 3        | Oligohydramnios, kidney and bladder not seen, limb abnormality | 18        | Bilateral multicystic and dysplastic kidney | Bilateral multicystic and dysplastic kidneys |
| 4        | Amniotic fluid absent unilateral multicystic kidney, other kidney not visualized | 18        | Female, subcutaneous edema, low set ears, cystic hygroma 5x6 cm, horse shoe kidney | Turner syndrome |
| 5        | Cystic hygroma, amniotic fluid normal, short limbs | 18        | Bilateral kidney absent | Bilateral renal agenesis |
| 6        | Oligohydramnios, bilateral kidneys and bladder not visualized | Intrauterine death at 20 weeks | Autopsy not done | Cystic kidney disease |
| 7        | Oligohydramnios, bilateral multicystic kidney disease | 19        | Autopsy not done | Meckel- Gruber syndrome |
| 8        | Oligohydramnios, bilateral enlarged bright echogenic kidneys, encephalocele, polydactyly | 19        | Bilateral Enlarged echogenic kidney, encephalocele, polydactyly | Meckel- Gruber syndrome |
| 9        | Nuchal fold thickness -9.5mm, mild bilateral pyelectasis | 20        | Amniocentesis for karyotyping done-trisomy 21, Autopsy showed- low set ears, clinodactyly, simian crease, anal atresia | Down Syndrome |

Figure 1: Ultrasound showing large cyst in abdomen. Autopsy picture showing with large abdomen with thinned out abdominal wall. Internal examination showed it to be bladder. Baby had urethral atresia (Case 13)

Figure 2: Ultrasound picture of limb body wall defect with enlarged cystic kidney. Autopsy picture confirming the same (Case 19)
Table 2: Fetus of more than 20 weeks gestation with gross extra renal anomaly

| Case no | Gestational age | Ultrasound finding | Outcome on follow up | Autopsy finding | Diagnosis |
|---------|-----------------|--------------------|----------------------|----------------|-----------|
| 10      | 22              | Arachnoid cyst, short curved spine, stomach bubble, bladder not seen severe oligohydramnios | Termination advised | Asymmetrical setting of ears, absent nipple, depressed mandible, Abnormality of spine and pelvis, tracheoesophageal fistula, post axial polydactyly, shortened or absent tibia fibula | VATER |
| 11      | 29              | Mild hydrocephalus, Spina bifida with menigomycocyele, oligohydramnios | Termination advised | bilateral absent kidney, spina bifida, meningomyocyele in thoraco-lumber region, nipple absent, CTEV | BRA with spina bifida |
| 12      | 31              | Microcephaly with irregular shape of the head (cloverleaf skull) ascitis, hyperechoic, bowel, oligohydramnios | IUD | Down syndrome phenotype, brachycephaly, TEV, kidneys appeared grossly normal. HPE - Loss of corticomediullary differentiation | Karyotype – trisomy 21, Down Syndrome |
| 13      | 26              | Massively enlarged bladder with hydroureter and bilateral hydronephrosis, diaphragmatic hernia, lung hypoplasia, severe oligohydramnios | Termination advised | Autopsy showed massively dilated bladder with hydroureter and urethral atresia, lung hypoplasia, anal atresia, undescended tests | Prune Belly syndrome. Urinary atresia |
| 14      | 36              | Bilateral hydronephrosis, enlarged bladder, hydroureter, multiple anechoic rounded mass suggestive of dilated bowel | Baby died after 6 hours of delivery | Bilateral Hydronephrosis, hydroureter, dilated proximal portion of urethra, PUV. Anal atresia, distended bowel loops with anal atresia | PUV with anal atresia |
| 15      | 36              | Intrauterine growth retardation, polyhydramnios, cyst in posterior fossa, dilated cisterna magna, small cerebellum, diaphragmatic hernia, bilateral hydronephrosis | LSCS | Died after an hour of delivery | Dandy walker malformation with CDH |
| 16      | 35              | Amniotic fluid normal, unilateral multicystic kidney with absent stomach bubble. Placenta previa | LSCS done | Baby died after 2 days | Cystic kidney with Tracheo- esophageal fistula |
| 17      | 37              | Spina bifida, MCK, amniotic fluid grossly reduced | | Autopsy not done | Bilateral multicystic kidney spina bifida, Prune belly syndrome |
| 18      | 30              | Omphalocele, Echogenic enlarged gut loops | Breech delivery male | Grossly distended thinned out abdominal wall, potters facies, talipes, anal atresia | Refused internal examination |
| 19      | 27              | Large anterior wall defect, with liver, intestines, heart, bladder herniating into it, bilateral multicystic kidney, amniotic fluid almost nil, cord not visualized properly | Termination advised, male | Large omphalocele, exrophy of bladder, imperforate anus, spinal deformity on the lumbar region, short cord, kidneys | Limb body wall complex |
| 20      | 36              | Transverse lie, enlarged cystic mass occupying whole of fetal abdomen, oligohydramnios, 2 vessel cord | LSCS, for transverse lie | Grossly distended abdomen with very thinned out abdominal wall, anal atresia, bladder sacculated and grossly distended no urethral stenosis, hydronephrosis, ureteral dilatation, gut loops distended | Prune belly syndrome |

VATER: Vertebral anomaly, anal atresia, tracheoesophageal fistula, renal anomaly, BRA: Bilateral renal agenesis, IUD: Intrauterine death, TEV: Tallipes equinovarus, HPE: Histopathological examination, PUV: Posterior urethral valve, LSCS: Lower segment cesarean section, CDH: Congenital diaphragmatic hernia, MCK: Multicystic kidney.

In 6 cases. Histopathology confirmed multicystic kidney in 5 and autosomal recessive polycystic kidney disease (ARPKD) in one fetus. In one patient with positive family history (case 21), the ultrasound finding of bright echogenic kidney was diagnosed on histopathology as multicystic kidney, showing the possibility of familial multicystic kidney disease [Figure 3].

In women of group III (9 cases), there was mainly lower urinary tract obstruction [Table 4], in this group prognosis chiefly depended upon the gestational age of diagnosis, renal cortical appearance, and degree of oligohydramnios. The mean gestational age was 31 weeks, 5 cases survived after delivery, 2 had vesicoureteral reflux, 3 underwent surgery, and one baby had deteriorating renal function. The diagnosis was after 32 weeks and renal cortical appearance was preserved in all cases that survived. LSCS was done in one case for fetal indication. Autopsy was done in all 4 cases which were stillborn [Figure 4]. There was posterior urethral valve in 3 cases and urethral atresia in one case.
Group IV consisted of total 13 cases, they had unilateral (7 cases) or bilateral affection (6 cases) with mild oligohydramnios or normal liquor, and bladder was seen in all cases [Table 5]. They were counseled that the prognosis was good and follow-up was required, the mean gestational age of presentation was 34 weeks. All of them were delivered live; LSCS was done for fetal indication in 2 of them. Kidney function test in all but one was normal although the ultrasound after delivery showed mild hydronephrosis persisting in 5 of them; 2 babies underwent surgery.

Autopsy was done in 27 cases out of total 29 stillbirths. There was extra renal anomaly present in 15 cases (27.3%). Chromosomal analysis was done in 10 cases and this was abnormal in 3 cases; in all 3 cases there were extra renal malformation as well. Out of the total 55 cases, 17 survived (32.1%), surgery was done postnatally in 5 cases.

Discussion

Renal malformations are detected in 0.2–2% of all newborns.\(^6\) The fetal kidneys and adrenal glands can be visualized by transabdominal ultrasound between

### Table 3: Fetus of more than 20 weeks gestation with oligohydramnios and bladder not visualized

| Case no | Gestation | Ultrasound finding                                                                 | Outcome on follow up                      | Autopsy/postnatal finding                                      | Diagnosis                                      |
|--------|-----------|------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------|-----------------------------------------------|
| 21     | 22        | Bilateral enlarged hyperechoic kidney, reniform shape maintained severe oligohydramnos | Advised termination                       | Potters facies, cord two vessel, tallipes, kidneys 3.75 x 2.75 cm, small 2-3 mm cysts | Multicystic kidney disease                    |
| 22     | 30        | Bilateral enlarged polycystic kidney 4x3 cm, reniform shape maintained, severe oligohydramnios, bladder not visualized | Preterm labor at 34 weeks                 | Live Baby had low apgar, respiratory distress, died after 24 hours, autopsy not done | Bilateral cystic kidney disease               |
| 23     | 24        | Bilateral echogenic enlarged kidneys, severe oligohydramnios                        | Advised termination                       | Autopsy showed enlarged spongy kidneys with multiple small cysts, HPE-confirmed the diagnosis | Polycystic kidney disease                     |
| 24     | 37        | Right kidney multicystic, oligohydramnios, other kidney not visualized             | Spontaneous labor                         | Live girl baby, enlarged multicystic kidney right kidney, left kidney small dysplastic, KFT derranged, had renal failure after 2 months, died at 3 months | Cystic kidney disease                         |
| 25     | 32        | Bilateral multicystic kidney, oligohydramnios                                      | Spontaneous labor, IUD                   | Autopsy not done                                               | MCKD                                          |
| 26     | 22        | Severe oligohydramnios, bilateral multicystic kidneys, Bladder not seen             | Advised termination                       | Female baby died after 3 hours, autopsy not done               | Cystic kidneys                                |
| 27     | 21        | Bilateral multicystic kidney, absent liquor                                       | Wanted to continue pregnancy LSCS done at term for fetal distress | Live female baby, died after 1 day | Cystic kidneys                                |
| 28     | 30        | Bilateral multicystic kidney, absent liquor                                       | Spontaneous labor                         | Autopsy not done                                               | Cystic kidneys                                |
| 29     | 26        | Oligohydranios, bilateral kidneys present, bladder not seen                        | IUD                                       | Male baby, Autopsy - kidneys small in size.HPE - bilateral dysplastic kidneys | Dysplastic kidneys                            |
| 30     | 31        | Bilateral multicystic kidney, severe oligohydramnios                                | Spontaneous labor, IUD                   | Female, Refused autopsy                                         | Cystic kidney                                 |
| 31     | 26        | Oligohydramnios, Bilateral kidneys IUD not visualized, bladder absent               | Spontaneous labor                         | Male baby, Contractures present, Potter's facies, bilateral kidneys absent | Bilateral renal agenesis                      |
| 32     | 35        | Left multicystic kidney, right dysplastic kidney, oligohydramnios                  | Spontaneous labor at term                 | Still born female baby, autopsy not done                        | Cystic kidneys                                |
| 33     | 24        | Bilateral echogenic kidney, bladder not seen, oligohydramnios                      | Wanted to continue pregnancy, Intrauterine death at 28 weeks | Potter's facies, tallipes, Internal examination not done        | Cystic kidneys                                |

KFT: Kidney function test, IUD: Intrauterine death, CTEV: Congenital tallipes equino varus, MCKD: Multicystic kidney disease, IUD: Intrauterine death, HPE: Histopathological examination
### Table 4: Fetus of more than 20 weeks gestation with bilateral renal involvement, oligohydramnios and bladder visualized

| Case no. | Gestation | Ultrasound finding                                                                 | Outcome on follow up | Autopsy finding                                                                 | Diagnosis        |
|---------|-----------|------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------|------------------|
| 34      | 22        | Bilateral hydronephrosis, dilated ureters, dilated urethra, severe oligohydramnios | IUD at 28 weeks      | Potter’s facies, TEV, bilateral hydronephrosis, dilated ureter, dilated proximal urethra, PUV | PUV              |
| 35      | 24        | Bilateral hydronephrosis with distended bladder, oligohydramnios                    | IUD at 26 weeks      | bilateral hydronephrosis with dilated ureters, dilated bladder and proximal urethra | PUV              |
| 36      | 34        | Bilateral hydronephrosis, corticomedullary differentiation present, distended bladder, amniotic fluid grossly reduced | Vaginal delivery at 37 weeks | Baby apparently normal after delivery | Vesico-ureteral reflux (VUR) |
| 37      | 36        | Bilateral hydronephrosis, distended bladder, oligohydramnios                       | spontaneous labor at 36 weeks | mild hydronephrosis on USG, KFT normal | VUR              |
| 38      | 28        | Bilateral hydronephrosis with dilated bladder and proximal urethra, severe oligohydramnios, | IUD                  | Bilateral hydronephrosis with dilated ureters, dilated bladder and proximal urethra | PUV              |
| 39      | 34        | Right kidney dilated calyces, loss of corticomedullary differentiation, left kidney also enlarged 6.8x3cm, bladder seen, oligohydramnios | Preterm labor, stillbirth | Right kidney hydronephrotic, left kidney 6x3.4 multicystic, dilated ureters, thickened bladder, dilated proximal urethra, distal urethra atretic, HPE- confirmed the diagnosis | Urethral atresia |
| 40      | 36        | Liquor reduced, bilateral kidneys normal, bladder overtly distended                  | LSCS done for fetal distress | Baby male, baby had phimosis, normal USG after birth | phimosis         |
| 41      | 38        | Bilateral hydronephrosis, small bladder seen, liquor reduced                        | Spontaneous labor     | Male baby, live bilateral UPJ obstruction, surgery done | Bilateral Uretero pelvic junction obstruction |
| 42      | 34        | Bilateral hydronephrosis, grossly reduced liquor, enlarged bladder                   | Labor induced at 36 weeks | Posterior urethral valve, surgery done | Posterior urethral valve |

IUD: Intrauterine death, PUV: posterior urethral valve, VUR: vesicourethral reflux, HPE: histopathological examination, USG: ultrasonography, UPJ: ureteropelvic junction

Ultrasound is a very effective diagnostic modality for identifying fetal urinary tract anomalies. But once the abnormality is diagnosed it is equally important to delineate the prognosis of malformation.

Our criteria for determining the prognosis of the malformation was based on evaluation of sonographic findings suggesting functioning kidneys to find out the severity of the disease. The cases in group I with associated extra renal malformation had poor prognosis for survival. LSCS in this group was only performed for maternal indications (3 cases). Detection of any renal malformation should warrant a detailed examination of the fetus for other

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**Figure 3:** Case 21, with positive family history and bilateral echogenic kidneys on USG, autopsy showing cysts of varying sizes on autopsy, histopathology confirmed it to be multicystic kidney

**Figure 4:** Ultrasound picture of bilateral hydronephrosis with enlarged bladder and typical keyhole sign. autopsy confirming the finding (Case 24)
Table 5: Fetus with unilateral or bilateral renal involvement, normal or slightly reduced liquor with normal bladder

| Case no | Gestation in weeks | Ultrasound finding | Outcome on follow up | Diagnosis |
|---------|--------------------|--------------------|----------------------|-----------|
| 43      | 34                 | Left kidney multicystic right kidney normal, liquor adequate | USG after delivery- Unilateral multicystic kidney, Baby normal after 1year | Unilateral multicystic kidney |
| 44      | 37                 | Hydroureter in left kidney, liquor normal | USG- Right kidney normal, left kidney hydronephrotic, surgery done, baby fine after 1 year | Unilateral UPJ obstruction |
| 45      | 30                 | Multicystic enlarged > 95th centile left kidney, cyst 10-20 mm in size, right kidney normal | Kidney function test (KFT) normal at delivery USG – same findings, right kidney was also multicystic at follow up after 1year, renal function test – normal. Fathers’ USG done – cyst in left kidney | ADPKD |
| 46      | 34                 | Unilateral mild hydronephrosis. Other kidney normal, liquor adequate | USG at delivery - normal | Normal |
| 47      | 36                 | Twin pregnancy with unilateral multicystic kidney in one fetus | Renal function test normal at delivery, USG- same finding, baby normal at 6 months | Unilateral MCKD |
| 48      | 32                 | Bilateral renal pelvis mild dilatation | Follow up ultrasound after 4 weeks showed gradually Normal decreasing hydronephrosis, normal after delivery, normal at 1 yr. follow up | Vesico-ureteral reflux (VUR) |
| 49      | 39                 | left kidney echogenic and enlarged, right kidney normal | LSCS done for breech, girl baby, left kidney smaller on USG postnatally, right normal, KFT- normal | Unilateral cystic/ dysplastic kidney |
| 50      | 37                 | Bilateral echogenic kidney, no cysts in liver | LSCS for fetal distress, live female baby, normal after birth | Cystic kidney disease |
| 51      | 33                 | Bilateral renal pelvis dilatation 10 mm and 12 mm, liquor mildly reduced | Kidney echogenic at follow up at 6 months and 1 year, KFT –abnormal after 1 yr | Phimosis |
| 52      | 38                 | Bilateral hydronephrosis 15mm, no calyceal dilatation seen mild polyhydranomnios | Vaginal delivery, male KFT Normal after 1month, hydronephrosis present on USG, decreasing hydronephrosis on follow up | Vesico-ureteral reflux |
| 53      | 31                 | Borderline pelvicalyceal dilatation 8 mm and 10 mm | Vaginal delivery, male, normal after one month | Normal |
| 54      | 32                 | Liquor adequate, left kidney pyelectasis (13mm), right kidney normal | Vaginal delivery, male baby, USG – mild hydronephrosis, MSU- Vesico-ureteral reflux | Vesico-ureteral reflux |
| 55      | 24                 | Liquor normal, left kidney multicystic, right kidney normal | Vaginal delivery at term. Baby – male, left kidney multicystic, right normal, normal renal function | Unilateral Cystic kidney |

USG: Ultrasonography, IUER: Intrauterine growth restriction, UPJ: Uretteropelvic junction, MCKD: Multicystic kidney disease, LSCS: Lower segment cesarean section

structural anomalies. Associated anomaly in our study was 27.3%, other studies have reported the incidence of up to 50%. Chromosomal studies on amniotic fluid should be offered in cases with renal malformation; the incidence of chromosomal abnormality in our study was 5.5%, and the incidence in other studies has reported to be 8-12%.[9,10] The incidence of chromosomal abnormality was low in our study population as many parents did not opt for the test.

The cases in which there were structural abnormality in kidneys coupled with loss of function, apparent in terms of non-visualization of bladder and absent or severely decreased liquor, the prognosis was believed to be poor and on follow-up none of the babies survived. Severe oligohydramnios and non-visualization of urinary bladder is associated with poor renal function. Fetal autopsy after termination of pregnancy is important to arrive at a definitive diagnosis. It may be difficult to detect bilateral renal agenesis on USG due to severe oligohydramnios and fetal autopsy is necessary to confirm renal agenesis and also any other associated malformation. This will help in counseling for next pregnancy. In cases where there was lower urinary tract obstruction but the kidneys were functioning, prognosis depended upon the gestational age at presentation. Almost all who survived presented after 34 weeks; it helped in timing of delivery, with induction done at 37 weeks to salvage the kidneys if possible. Ultrasound diagnosis when made early helps in the timing of delivery and also the route of delivery and early treatment.[9]

We did not attempt prenatal bladder drainage but the recent review on effectiveness of antenatal intervention for treatment of congenital lower urinary tract obstruction done by Morris et al., concluded that although bladder
Renal malformations are commonly detected on antenatal ultrasound. Prognosis varies upon the type of malformation and associated malformations. The antenatal sonographic evaluation and counseling helps in delineating the prognosis and thus helping the couple to make reproductive decision. Pregnancy can be terminated in cases of lethal abnormality, if diagnosed early. The authors report no conflict of interest.

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