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Original Research Article

A STUDY ON PRENATAL DIAGNOSIS AND POST NATAL EVALUATION OF FETAL RENAL PYELECTASIS

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ABSTRACT

Background: Pyelectasis is a common and typically benign finding. Identifying the cases that may progress is crucial for guiding perinatal management and avoiding unnecessary interventions that can lead to increased costs and parental anxiety.

Materials and Methods: 300 patients with antenatal scans showing fetal pyelectasis were followed up by the Department of Fetal Medicine and Department of Pediatric Urologyupto 1 month after delivery. The results of antenatal scans were assessed.

Results: Amongst the 375 patient records that had fetal pyelectasis on antenatal scans, 75 lost follow-up till delivery. Amongst the 300 patients who had antenatal detected pyelectasis, persistent pyelectasis was seen in 260 patients by end of third trimester; in 125 patients after delivery and in 40 patients after 1 month of birth. Most common cause of persistent pyelectasis observed in the study was vesicoureteric reflux. Surgical intervention was needed in 5.6% patients.

Conclusion: Antenatal detection and grading of pyelectasis helps to know which needs subsequent follow up immediately post birth and intervention/procedures as needed on timely basis to prevent ensuing renal damage.

Keywords: fetal pyelectasis, fetal urology, ultrasonography, VUR.

INTRODUCTION

Pyelectasis (PE) is a common ultrasound finding where the fetal renal pelvis is dilated, occurring in 1-5% of fetuses in the second and third trimesters of pregnancy.[1,2]

Many cases are referred to specialty centers for repeated ultrasound monitoring, but this does not significantly impact the prognosis, as pyelectasis is typically a self-limiting condition that resolves on its own. However, in some instances, the pyelectasis can progress and lead to more severe dilatation and hydronephrosis, potentially affecting amniotic fluid levels and renal function.[3-5]

There is no consensus on the exact criteria of antero-posterior renal pelvic diameter used to define pyelectasis. Identifying which cases are likely to progress is important for determining the appropriate perinatal care strategy. Excessive monitoring through repeated ultrasounds can be costly and cause unnecessary anxiety for parents.[6-8]

A better understanding of the natural history of fetal pyelectasisand the factors that contribute to progression could help avoid unnecessary interventions and provide parents with more accurate information. In cases where there is a risk of underlying renal disease, appropriate diagnostic tests and treatments can be performed to prevent long-term kidney damage.

This study aims to evaluate cases of fetal pyelectasis detected during the second trimester and correlate to its postnatal progress and outcomes.

MATERIAL AND METHODS

A retrospective analysis was done in the Department of Urology, _____over 3 years period. Records of pregnant women whose antenatal scans detected fetal pyelectasis of varying severity, i.e., from mild to

severe degree, during the second trimester, were included in the study.

Exclusion Criteria: Patients with multiple gestations or presence of fetuses with extra-renal manifestations or detection of fetal chromosomal or genetic abnormalities or cases which underwent termination of pregnancy or cases which didn't turn up for follow-up were excluded from the study.

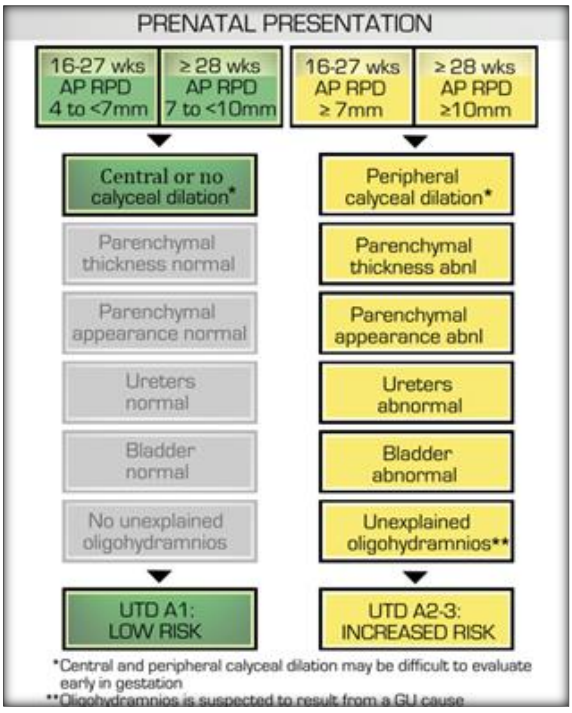
Thesepatients were followed upto delivery and into the post-natal period. The results of prenatal ultrasound were correlated with post natal ultrasound examination.

375 pregnant females whose second trimester ultrasound examination detected fetal pyelectasis were included in the study after taking a written informed consent. These patients were asked to come for routine antenatal checkups to the same institution and were encouraged to have an institutional delivery.

Post- delivery of the fetus, baseline ultrasound KUB/ micturating cystourethrogram (MCUG) was done. Surgery / procedure were done in indicated patients.

Ultrasound examination: it was done by experienced sonologist. Transvaginal and transabdominal ultrasound examination was done. Anteroposterior (AP) diameter of the renal pelvis, at the level of the renal hilum; as seen in the transverse plane was measured according to the standard method used to evaluate the grade of antenatal fetal pyelectasis.[9]

The classification of prenatal urinary tract dilatation, or UTD classification, was determined in 2014 by a multidisciplinary agreement.[10]



RESULTS

375 cases were detected to have fetal pyelectasison antenatal scans. However, 75 cases lost follow-up. A total of 300 cases were examined over a period of 3 years. The mean age of the study population was 27.18 year with range of 20-38 years.

Majority of the patients belonged to second gravida (62.5%), followed by primi gravida (25%). Mean birth weight of the study population was 3570 grams with most of the babies having normal birth weight (53.75%). The remaining neonates were of low birth weight.

The male: female ratio of the neonates was 2:1 (males = 200; females = 100).

Antenatal scans during the second trimester revealed that majority of the fetuses had AP diameter of renal pelvis < 10 mm (n = 43.75%). [Table 1]

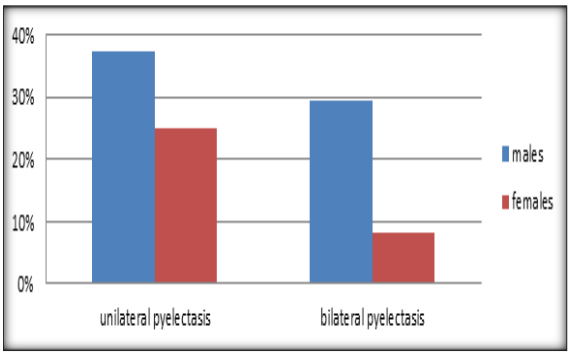


Figure 1: Unilateral Versus bilateral Pyelectasis

Amongst the 300 fetuses detected to have pyelectasis during the second trimester, complete regression of pyelectasis by third trimester was seen in 40 cases (13.3%); 200 cases there was no change in AP diameter (66.7%) and the rest of 60 cases (20%) had progression of pyelectasis. Among these 60 cases, 40 cases had developed oligohyramnios.

Post-delivery, 58.3% (n=175) of the neonates had normal findings on renal ultrasound examination. In rest of the cases post natal pyelectasis was seen. 10% had no change in the AP diameter of the pelvis, while AP diameter had increased in the rest of the neonates (31.7%). [Table 2]

By the end of 1st month, abdominal ultrasound examination was done as a part of screening procedure for pyelectasis. 83% had normal USG report, while in the rest of the 17% cases, there was persistent and increased AP diameter of renal pelvis. [Table 3]

Upon further investigations, among these 40 cases with persistent pyelectasis, 7 had ureteropelvic junction stenosis; 5 patients had ureterocele; 18 patients had primary vesicoureteral reflux (VUR) and 10 patients had posterior urethral valve (PUV) with vesicoureteral reflux (VUR). [Table 5]

Patients with VUR need to be observed till 1 year of life before starting a definitive procedure as the bladder will be very small. Amongst the 28 patientswith VUR (18 patients with primary VUR

and 10 patients with VUR + PUV), 8 had Grade I VUR; 8 had grade 2 VUR; 6 had Grade 3 VUR and 4 had Grade 4 VUR and 2 patients with Grade 5 VUR. [Table 6]

Out of the 40 patients, surgical intervention was required in 17 patients. [Table 7]

Table 1: AP diameter of renal pelvis

AP diameter	No. of fetuses
< 10mm	150 (50%)
10-15 mm	60 (20%)
>15 mm	90 (30%)

Table 2: Outcomes of fetal pyelectasis by third trimester

Outcome	No. of patients	No. of males	No. of females
Complete regression	40 (13.3%)	25	15
No change in Diameter	200 (66.7%)	135	65
Progression	60 (20%)	40	20
Total	300	200	100

Table 3: Post-delivery outcomes of fetal pyelectasis

Outcome(of n = 300)	No. of patients
No evidence of pyelectasis	175 (58.3%)
No change in Diameter	30 (10%)
Progression	95 (31.7%)

Table 4: Outcomes of fetal pyelectasis by end of 1st month of life

Outcome (of n = 300)	No. of patients
No evidence of pyelectasis	260 (86.7%)
Increase in Diameter with persistent pyelectasis	40 (13.3%)

Table 5: Cause of persistent pyelectasis

Cause (of n = 300)	No. of patients
Ureteropelvic junction stenosis	7 (2.3%)
Ureterocele	5 (1.6%)
Primary vesicoureteral reflux	18 (6%)
Vesicoureteral reflux with posterior urethral valve	10 (3.3%)
Total	40 (13.3%)

Table 6: Grading of vesicoureteral reflux (n =28)

Grade	No. of patients
Grade 1	8
Grade 2	8
Grade 3	6
Grade 4	4
Grade 5	2
Total	28

Table 7: Outcomes

Condition	Outcomes
Ureteropelvic junction stenosis (n=7)	2 patients required pyeloplasty after 1 year and the rest 5 were asked to follow-up
Ureterocele (n=5)	All 5 patients required cystoscopy with ureterocele puncture
Primary vesicoureteral reflux (n = 18)	All 18 patients were kept on antibiotic prophylaxis till 1 year of age
Vesicoureteral reflux with posterior urethral valve (n=10)	All 10 patients required cystoscopy with PUV fulguration surgery

DISCUSSION

Fetal pyelectasis is one of the most commonsonographical finding reported during antenatal scans. Majority of these are isolated antenatal hydronephrosis (IAH), but at times it is associated with chromosomal abnormalities and genito-urinary tract abnormalities.[11,12]

Management of isolated antenatal hydronephrosis involves frequent sonological examinations over time to see progression or regression of the condition. Regression of antenatal pyelectasis at the end of gestational period or post-delivery or after 1 month of life doesn't require any additional scans.[13]

In majority of the cases, antenatal scan is not adequately sensitive enough to detect any genito-urinary abnormalities. But it can detect progression of pyelectasis with which the presence of any anatomical abnormalities should be thought of and must be referred to pediatric nephrologist or pediatric urologist.[14]

In present study, amongst the 300 patients who had pyelectasis detected during antenatal period, persistent pyelectasis was seen in 260 patients by end

of third trimester; 125 patients had pyelectasis detected in the immediate post-natal period (after delivery) and it persisted in 40 patients after 1 month of birth. Similar regressing trend was observed in studies done by Karageyimet al,[15] Yavaşcan et al,[16] and Shamshiraz et al.[17]

Males were most commonly involved in present study, which is in accordance with studies done by Blacharet al,[18]

In present study, the most common cause of persistent pyelectasis was vesicoureteric reflux (VUR), seen in 9.3% of the newborns which is accordance with studies done by Shamshiraz et al.[17]

Voiding cystourethrography is the diagnostic test of choice in VUR and PUV. In present study, isolated VUR was seen in 6% and VUR along with PUV was seen in 3.3%.

According to most of the studies, in patients with antenatal hydronephrosis, the incidence of uretero-pelvic junction stenosis (U-P stenosis) (10-15%) is usually higher than the incidence of posterior urethral valves (PUV) (1-2%) in post-natal period. However in present study, the incidence of PUV is higher than that of U-P stenosis. This could be attributable to the fact that ours is an advanced institution where complex cases such as PUV are sent for screening while the less complex cases such as U-P stenosis are screened at peripheral centers.[19-21]

In present study, surgical intervention was required in 17 patients (5.6%). There were no maternal or perinatal deaths reported in present study.

CONCLUSION

Fetal pyelectasis is usually a physiological condition which subsides over by 1st month of life. Regression of pyelectasis completely doesn't require any further investigations. Screening for fetal pyelectasis during regular antenatal scans will detect this condition and then can be followed up for progression or regression. Surgical correction is the definitive treatment for persistent post-natal pyelectasis.

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Conflicts of Interest: Nil.

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