



## A COMPARATIVE STUDY OF FOETAL PYELECTASIS IN THE SECOND AND THIRD TRIMESTER

### Radiodiagnosis

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### ABSTRACT

Foetal pyelectasis is a common anomaly detected at the 20-week anomaly scan. The aim of this study was to detect foetal pyelectasis in the routine second and third trimester using ultrasonography and to evaluate the changes in the status of pyelectasis during third trimester and post natal period. Study was done on 54 antenatal women who were referred to our hospital for routine second and third trimester antenatal ultrasound examinations. Ultrasonogram was performed for these patients. We illustrated the ultrasonogram examination findings of the foetal kidneys, and the renal pelvic (anterior-posterior) diameter was noted.

### KEYWORDS

Foetal pyelectasis, Pregnancy, Trimester, Kidney, Ultrasonography

### INTRODUCTION:

Foetal Pyelectasis is the prominence or the dilatation of the renal pelvis caused in-utero. It is at the mild end of the foetal hydronephrosis spectrum. In the 2nd trimester antenatal ultrasound scan, it is a relatively common finding with a noted male predilection and an estimated prevalence is at approximately 2% of routine second trimester scan(1). Pyelectasis can be caused by a number of factors. It is physiological and resolves spontaneously in majority of the cases. In the majority of cases, it is physiological and resolves spontaneously. Foetal pyelectasis can also be affected by maternal hydration: physiological foetal pyelectasis(2). Either during pregnancy or in the early post natal period, the vast majority of the cases (~96%) with mild pyelectasis in the second trimester resolve. With increasing degree of pelvicaliceal dilatation, in utero progression, bilateral involvement, the risk of post natal pathology is increased.

The other ancillary findings of foetal pyelectasis include dilated renal calyces, dilated distal ureter and concurrent oligo-hydramnios if the involvement is bilateral or unilateral with significant renal impairment and dysfunction of the other kidney. In the second trimester, severity of foetal hydronephrosis may be graded as mild (4mm and 7mm in second and third trimester respectively), moderate (7mm and 10mm in second and third trimester respectively) and severe (>10mm and 15mm in second and third trimester respectively)(3,4). Antenatally detected renal pelvic dilatation (in isolation) is considered a weak predictor of vesicoureteric reflux(5). If 6 mm or more of renal pelvic dilatation is detected prior to 28 weeks, a repeat prenatal scan is done at 30-40 weeks of gestation, as well as postnatal follow-up for persistent pyelectasis(6). Most cases with pyelectasis resolve spontaneously in the first year of life. Management will depend on the underlying pathology. The degree of renal pelvic dilatation correlates with outcome. A renal pelvic anterior-posterior diameter (APD) of 9 mm or more, and a pelvic-to-renal APD ratio of 0.45 before 32 weeks of gestation and 0.52 thereafter, are considered to be useful for the detection of a severe outcome postnatally(7).

### MATERIALS AND METHODS:

Antero Posterior (intra) renal pelvic diameter(RPD) is measured in a transverse scan of the foetal abdomen using Mindray DC8 and GE Voluson 4D ultrasound machines if Foetal Pyelectasis is present it will be classified as Mild, Moderate and Severe.

### SONOGRAPHIC CRITERIA FOR PYELECTASIS (RPD):

- Greater than 4mm in second trimester.
- Greater than 7mm in the third trimester.

### SECOND TRIMESTER:

- Mild : Renal pelvic diameter 4-7 mm
- Moderate: Renal Pelvic diameter 7-10 mm

- Severe: Renal pelvic diameter >10 mm

### THIRD TRIMESTER:

- Mild: renal pelvic diameter 7-9 mm
- Moderate: renal pelvic diameter 9 - 15 mm
- Severe: renal pelvic diameter >15 mm

### FOLLOW UP OF NEW BORN:

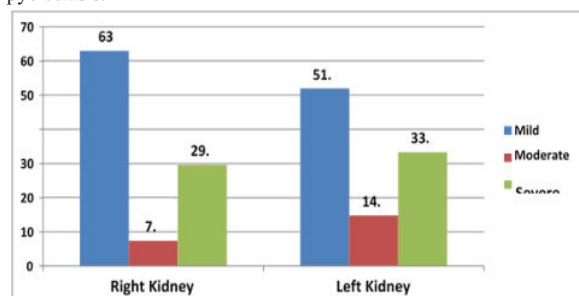
- Screening with two renal USG scans on the 5th day and 30th post natal day will be done to check for any pyelectasis and if pyelectasis is present it will be followed up monthly for a period of six months.

### OBSERVATION AND RESULTS

|          | LEFT KIDNEY |            | RIGHT KIDNEY |            |
|----------|-------------|------------|--------------|------------|
|          | FREQUENCY   | PERCENTAGE | FREQUENCY    | PERCENTAGE |
| MILD     | 17          | 63.0       | 14           | 51.9       |
| MODERATE | 02          | 7.4        | 04           | 14.8       |
| SEVERE   | 08          | 29.6       | 09           | 33.3       |
|          | 27          | 100        | 27           | 100        |

**Table 1: Grade of Foetal Pyelectasis in Right Kidney and Left Kidney among patients attended during the second trimester**

From the above table we can infer that the total number of cases which came for second trimester antenatal ultrasound examination were 27. Out of these 27 cases, 17(63%) cases were diagnosed with mild pyelectasis, 2(7.4%) cases with moderate pyelectasis and 8(29.6%) cases with severe pyelectasis of the right kidney. Likewise in the left kidney 14(51.9%) of the cases were diagnosed with mild pyelectasis, 4(14.8%) with moderate pyelectasis and 9(33.3%) with severe pyelectasis.



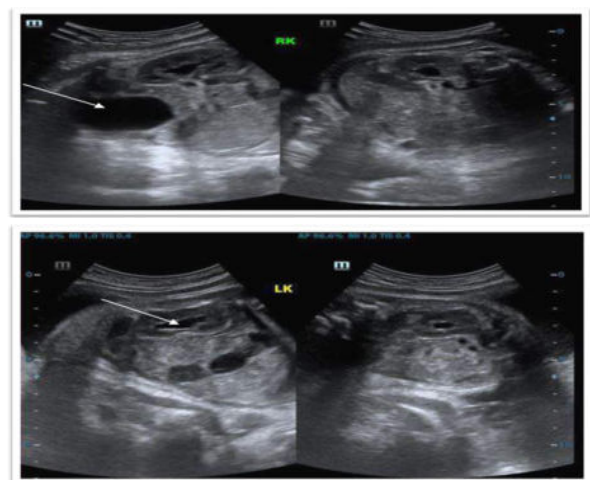
**Figure 1 Shows grade of foetal pyelectasis in the right kidney and left kidney among patients attended during the second trimester.**

In about 19(70.4%) of the cases had foetal pyelectasis in right kidney, 2(7.4%) cases in the left kidney and 6(22.2%) in the bilateral kidneys during the second trimester. The above figure is a bar chart explaining the percentage of cases diagnosed with foetal pyelectasis affecting the right and the left kidneys under the grades mild, moderate and severe. It is seen that, in the second trimester antenatal scan, in the right kidney 63% of the cases were of mild grade (renal pelvic diameter in the range of 4mm-7mm), 7.4% of the cases had moderate pyelectasis (renal pelvic diameter in the range of 8mm-10mm) and 29.6% of the cases had severe pyelectasis (renal pelvic diameter more than 10mm).

**Table 2: Grade of Fetal Pyelectasis in the Right and Left kidney among patients attended during third trimester**

| GRADE    | LEFT KIDNEY |            | RIGHT KIDNEY |            |
|----------|-------------|------------|--------------|------------|
|          | FREQUENCY   | PERCENTAGE | FREQUENCY    | PERCENTAGE |
| MILD     | 13          | 48.1       | 12           | 44.4       |
| MODERATE | 05          | 18.5       | 05           | 18.5       |
| SEVERE   | 09          | 33.3       | 10           | 37.0       |
| TOTAL    | 27          | 100        | 27           | 100        |

From the above table we can infer that the total number of cases (few cases which were earlier diagnosed with foetal pyelectasis in the second trimester and had persisting pyelectasis were included; resolved cases were excluded and cases that were newly diagnosed of foetal pyelectasis in the third trimester were included) which came for the third trimester antenatal ultrasound examination were 27. Out of these 27 cases, 13(48.1%) cases were diagnosed with mild pyelectasis, 5(18.5%) cases with moderate pyelectasis and 9(33.3%) cases with severe pyelectasis of the right kidney. Likewise in the left kidney 12(44.4%) of the cases were diagnosed with mild pyelectasis, 5(18.5%) with moderate pyelectasis and 10(37%) with severe pyelectasis.



**Figure: 2 Shows moderate hydronephrosis of left kidney (arrow) and right kidney in the third trimester**

#### DISCUSSION:

Our study was done on 54 antenatal women who were referred to our hospital for routine second and third trimester antenatal ultrasound examinations. Ultrasonogram was performed for these patients. We illustrated the ultrasonogram examination findings of the foetal kidneys, and the renal pelvic (anterior-posterior) diameter was noted. The findings (values) were noted down under the grades namely, mild, moderate and severe. In the second trimester the cut off values for the above mentioned grades were as 4- 7mm as mild; 8mm-10mm as moderate and >10 mm as severe. Similarly in the third trimester 7-9mm as mild, 10-15 as moderate and >15 as severe.

In the second trimester 27 antenatal women were diagnosed with foetal pyelectasis, of which 17 patients were diagnosed with mild pyelectasis, 2 patients - with moderate pyelectasis and 8 patients with severe pyelectasis in the right kidney and 14 patients with mild pyelectasis, 4 patients with moderate pyelectasis and 9 patients with severe pyelectasis in the left kidney. These 27 antenatal women were counselled and advised to come for a follow up third trimester ultrasonogram examination.

It was seen that 6(22.2%) cases out of 27 cases were bilaterally affected in the second trimester and 10 cases out of 27(37%) cases in the third trimester. The mean rank value for the grades of right kidney by measuring the renal pelvic diameter in the second trimester, third trimester and postnatal period was 2.0, 2.22, and 1.78 respectively and was found significant. The mean rank values for the grades of left kidney by measuring the renal pelvic diameter in the second, third and postnatal period was 2.0, 2.11 and 1.89 respectively and was not significant.

Our study findings also corresponded with the study done by Sairam et al and Sidhu et al. Sairam et al concluded that cases having RPD >4mm and <7mm in the second trimester resolved either in the third trimester or early post natal period. In our study cases with RPD in similar range resolved in the 5th post natal day (early post natal period). 3 cases with severe pyelectasis did not resolve. Of the three cases 1 was bilaterally affected.

Our study findings were in contrast to the findings in the study done by Bobrowski et al. which said that 80% of the cases had bilateral involvement where as in our study it was 22.2% and 37.% in the second and third trimester respectively.

Our study was also in contrast to the study done by Persutte et al. which found 27% cases with RPD 4mm-9mm progressed to post natal hydronephrosis where as in our study all cases in that range did not progress to post natal hydronephrosis.

#### CONCLUSION:

Foetal Pyelectasis have been encountered in the antenatal patients during the routine second and third trimester ultrasonography. Ultrasound is the modality of choice to monitor the status of the foetal pyelectasis in the subsequent trimester and also in the post natal period. Ultrasound clearly has the advantage as there is no risk of radiation exposure to the mother or the foetus during the scans.

It is observed that more than 90% of the cases resolve in the subsequent trimesters in the antenatal period itself or in the early post natal period. In cases with progressive dilatation of the renal pelvis, obstructive pathology the probability of uropathies in the post natal period is increased. The child may present with frequent infections, renal pathologies and also involving the entire urinary tract depending on the level of obstruction.

In our study of the 54 antenatal cases diagnosed it was observed that 49 cases (90.7%) of the cases got resolved in the post natal period. 5 cases were followed up at the end of 1 month, 3 months and 6 months for a repeat ultrasonogram to check the status of pyelectasis. We conclude that majority (90.7%) of the antenatally diagnosed cases of foetal pyelectasis resolved by itself without any intervention. Mild to moderate pyelectasis more often resolve by itself without any intervention or medication. Severe pyelectasis however are prone for urinary tract abnormalities and obstructive pathologies.

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