ORIGINAL ARTICLE

Prenatal Mild Pyelectasis: Result of Screening and Follow up in 3450 cases in Ahwaz City

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ABSTRACT

Aim. To determine prevalence and outcome of fetuses with mild pyelectasis during pregnancy and after birth.
Methods: A retrospective study on 3450 women who were referred for second-trimester ultrasound. Fetuses with mild pyelectasis were followed.
Results: 105 (3%) fetuses with mild pyelectasiswere identified in women with mean age of 30 ±3.7 years.77 fetuses (73.3%) were male and 28 cases (26.7%) were female.(P-value =0.06) 29 cases (27.6%) were gravid one, 46 cases (43.8%) were gravid two and 30 cases (28.6%) were gravid three. 71 cases (67.6%) were in the low risk group of aneuploidy, 17 (16.2%) in the intermediate risk group and 17 (16.2%) in the high risk group. Seven cases (6.7%) had cell free testing, all of which were in low risk group. One major cardiac abnormality was reported. Two (1.9%) cases had IUFD. In 9 cases (8.6%), third trimester follow-up ultrasound showed an increase in pyelectasis. Five case (4.8%) had pre-term delivery, 84 cases (80%) term delivery and 8 cases (7.6%) post-term delivery. 89 neonates (84.8%) weighed between 2500 and 4000 grams. 9 (8.7%) cases were admitted to NICU. All neonates had normal phenotype. On follow-up sonographic exam one week after birth, 11 cases (10.6%) showed urinary tract dilation.
Conclusions: Without association with other structural abnormality, motherswho have fetuses with isolated MP must be reassured that the prenatal and postnatal outcomes are good. However 3rd trimester and postnatal follow up for best recommendation is needed.
Key words: Ultrasonography, Fetus, Mild pyelectasis, Outcome

INTRODUCTION

Widespread screening testes including second trimester ultrasound, to identify fetuses at risk of aneuploidy has resulted in increased detection of anomalies of the urinary system[1,2]. Urinary tract dilation is the most common urinary tract abnormality observed in prenatal ultrasound and has a prevalence of 2 to 5.5% in various studies[2,3]. According to various studies, mild pyelectasis (MP) refers to a condition that the renal pelvis diameter (RPD) in second trimester measured ≥ 4 and <10 mm in anteroposterior (AP) dimensions in transverse axial scans of the abdomen, with no calyceal dilation[4,5,6,7,8.] We know little about the clinical significance of mild pyelectasis in the fetus and it is unclear, but its diagnosis during ultrasonographic screening is important for two main reasons: first, it can predict underlying pathology in the renal and urinary tracts system, and second, mild pyelectasis is one of the soft markers of aneuploidy[1,6,9]. Some consider MP as a physiological condition without any clinical importance. On the other handsome recent studies have shown its relationship with significant pathological conditions that may need a surgical correction for prevent a permanent damage to renal function[6]. In this study, we aimed to identify the fetuses with mild pyelectasis in our study population and to evaluate their outcome during pregnancy and after birth.

METHODS

The present study is aretrospective cross-sectional descriptive-analytical study on women who referred to a radiology screening clinic during the august of 2015 to the march of 2018 for second-trimester ultrasound screening. Ultrasonographic scans were carried out by a highly specialized radiologists in obstetric ultrasonography. Mild pyelectasis (MP) is referred to as maximum AP diameter greater than or equal to 4mm of renal pelvis in a transverse scan. All fetuses with mild pyelectasis are included to the study. In case of dissatisfaction with the study and cases where access to information was incomplete, excluded from the study. Maternal age information, type of pregnancy, maternal parity, sonographic findings, screening findings in the first and second trimesters (including NT, biochemical tests, CVS, amniocentesis, cell free) and other pregnancy surveys (including ultrasound, fetal echocardiography), as well as infant status at births including birth weight and gender of infants and the need for NICU admission and postnatal surveys were collected from maternal files. In case of missing data, women were called and information was obtained.
Statistical Analysis: Data analysis was performed by using SPSS for Windows, version 22. The discrete variables and nominal variables were shown as descriptive statistics such as mean and standard deviation, ratio, min-max, number of cases, frequency and percentage, where applicable. Data were analyzed by chi-square, T-test. In cases of inaccessibility to information, the parameters were considered as missing data. A p value <0.05 was considered statistically significant.
Ethics approval: The present study was approved by the Code of Ethics: IR.AJUMS.REC. 1398.566 In the Ethics Committee of Research of the Ahwaz Jundishapur University of Medical Sciences.

RESULTS

Among the 3450 pregnant women who received a second trimester screening ultrasound, 105 (3%) fetuses with MP were identified. The studied women had a mean age of 30±3.7(± standard deviation) years and ranged in age from 19 to 37 years. 29 cases (27.6%) were gravid one, 46 cases (43.8%) were gravid two and 30 cases (28.6%) were three. (P-value =0.092) 103 cases of these were result of spontaneous pregnancy and two had IVF. There were 71 cases (67.6%) in the low risk group (Risk assessment performed by NT and biochemical tests in first and second trimesters), 17cases (16.2%) in the intermediate risk group and 17 cases (16.2%) in the high risk group. (P-value =0.41).

Table 1. Demographic data and findings

	Number
All cases with MP	105
Maternal Age (years), mean±SD Min-max	30 ±3.7 19-37
Gravidity G1 G2 G3	 29(27.6%) 46(43.8%) 30 (28.6%)
Type of pregnancy Spontaneous IVF	 103 2
Cell free test Low risk Not don	 7 98
Risk assessment Low Intermediate High	 71 (67.6%) 17 (16.2%) 17 (16.2%)
Amniocentesis Euploid Not don	 1 104
Abortion(IUFD)	2 (1.9%)
Fetal echocardiography Major cardiac abnormality	23 1
Sex Male Female	 77(73.3%) 28(26.7%)
Third trimester sonograhpy Increase of RPD No increase Not don	 9(8.6%) 88(83.8%) 8
Weight at delivery <2500gr 2500-4000gr >4000gr Missing data	 2 (1.9%) 89(84.8%) 6 (5.7%) 8
GA at delivery Pre-term Term Post-term Missing data	 5(4.8%) 84(80%) 8 (7.6%) 8
Phenotype Normal	 103
Postnatal sonograhpy Urinary tract dilation No urinary tract dilation Missing data	 11(10.6%) 88 4
Postnatal survey UPJO VUR Missing data	 5(4.8%) 1(0.9%) 5

Seven cases (6.7%) had cell free testing, all of which were in low risk group. 23 fetuses underwent fetal echocardiography and one major cardiac abnormality (Major structural abnormality) observed. One case underwent amniocentesis, which was normal. Of the 105 fetuses with MP, two (1.9%)intrauterine fetal death (IUFD) reported (one was spontaneous abortion in 21 weeks fetus in high risk group and another one was 30 weeks fetus with NT = 6.5mm and major cardiac abnormality in a twin pregnancy).In 9 cases (8.6%), third trimester follow-up ultrasound showed an increase in pyelectasis and in 88 cases (83.8%) it remained constant or decreased. (P-value =0.65)Among103 pregnancies leading to live birth, five case (4.8%) had pre term delivery, 84 cases had (80%) term delivery and 8 cases had (7.6%) post term delivery. Two neonates (1.9%) weighed less than 2500 grams, six neonates (5.7%) weighed more than 4000 grams and 89 neonates (84.8%) weighed between 2500 and 4000 grams.77 cases (73.3%) were male and 28 cases (26.7%) were female. (P-value =0.06)9 (8.7%)neonates were admitted to NICU. (P-value =0.51)All 103 neonates with MP at the second trimester ultrasound had normal phenotype at birth.On follow-up sonographic exam one week after birth, 11 cases (10.6%) showed urinary tract dilation (RPD> 10 mm and/or calyceal dilation and/or abnormal Ureters).During two to six monthpostnatal survey five (4.8%) cases of Ureteropelvic Junction Obstruction (UPJO) and one (0.9%) case of Vesicoureteral Reflux(VUR) were confirmed. Demographic data and findings are showed in table 1.

DISCUSSION

As mentioned above, fetal urinary tract dilation is one of the most controversial topics in terms of clinical significance as well as its management. And for this reason, many studies have been done in this field so far and various guidelines are available. Here, however, we compare the status of our population with that of other communities. In this study, MP was observed in 3%of pregnancies, which is similar to that reported in the literatures[2,3]. In one case, there was an association with major structural abnormality that cause spontaneous IUFD. There were no significant association between isolated MP and major structural or cardiac abnormality, poor pregnancy outcome (abortion, pre-term / post-term labor, low or high birth weight) or neonatal hospitalization. No case of aneuploidy is observed and all newborns had normal phenotype. According to different studies, there was no significant difference in abortion, pre-term / post-term delivery, abnormal birth weight among mothers with isolated MP in this study and normal low risk population[10,11,12,13]. In Claudio Coco et al, Pyelectasis was observed in 2.9% (366/12,672) of the fetuses (83.3% were isolated). The overall prevalence of trisomy 21 was 0.087% (11/12,672) that, among these, two had pyelectasis, one isolated, and one associated with other structural abnormality. Based on this study in the absence of structural abnormality, isolated pyelectasis is not a justification for the performance of an amniocentesis[14] In our study MP has higher percentage in male fetuses. Joseph R. Wax et al. showed that malefetuses have a significantly higher frequency of urinary tract dilatation compared with female fetuses[15].

Nine(8.6%) fetuses showed getting worse in urinary tract dilation in third trimester follow-up ultrasound, and all these cases had hydronephrosis in postnatal ultrasound. Among these two cases of UPJO were conformed in postnatal survey. In addition three other cases of UPJO and one case of VUR were detected in our follow up. These finding in our study is fewer in percentage in compare with other studies:

In G. AHMAD et al study was performed in the postnatal period of 38 fetuses with MP. 13.1% of cases had a finding on diagnostic survey with no need to surgery (7.9% had VUR, 2.6% had renal dysplasia and 2.6% had ureteral pelvic junction stenosis)[3]. Mervyn S Jaswon et al, followed 104 fetuses with MP and 23 (22%) cases of VUR were seen in postnatal testing, and based on their study a normal postnatal ultrasound exam does not rule out the presence of VUR[16].

In contrary some studies have shown better outcomes: In a case-control study of 146 cases with fetal MP by Henny A. M. Damen-Elias et al., 41 cases had ultrasound in the postpartum period and 3 had sustained pyelectasis, 3 case had recurrent UTI and one case had surgery. Three of the controls showed recurrent UTI and one case had urinary incontinence. This study concluded that children with MP in the fetal period have no higher urinary system morbidity in compare to control group and need no more investigation in post natal period[5].

However nowadays significant variation exists in the clinical management of neonates with prenatally diagnosed MP. Pediatric Urologist classified fetuses with isolated MP (with no calyceal dilation or with central calyceal dilation) as low risk group of Urinary Tract Dilation (UTD A1) classification. For these fetuses ifthe evaluation in 3rd trimester reveals resolution of the pyelectasis with no other findings(parenchymal, bladder or ureters abnormality) nofurther prenatal or postnatal follow up is necessary. If 3rd trimester ultrasound shows persistent UTD A1 or increase in dilation, postnatal follow up recommended (including one ultrasound exam in2-30 days after birth; and the second one 1-6 months later) and based on findings and clinicians discretion prophylactic antibiotics and/or evaluation with VCUG is recommended[17]

However, due to some limitations, our study could not investigate this guideline in follow-ups.It seems because a normal ultrasound does not rule out an underlying disorder in the urinary system, this conservative follow up is reasonable. But Hiep T. Nguyen et al. emphasize that further research to assess utility of this grading system and guide line is needed[17].

CONCLUSION

Despite the limitations, our study shows that our population situation in this topic is almost similar to other studies, and to reduce parents' concerns, we can reassure them that the outcome of pregnancy and infancy in these fetuses is desirable, but 3rd trimester and postnatal follow up for best recommendation is needed. However, further studies are needed to evaluate guidelines and approach to MP in our community.

REFERENCES

1. Ali MK, Shazly SA, Ali AH, Abdelbadee AY, Abbas AM. Ultrasonographic soft markers of aneuploidy in second trimester fetuses. Middle East Fertility Society Journal. 2012;17(3):145-51.
2. Sinha A, Bagga A, Krishna A, Bajpai M, Srinivas M, Uppal R, et al. Revised guidelines on management of antenatal hydronephrosis. Indian pediatrics. 2013;50(2):215-31.
3. Ahmad G, Green P. Outcome of fetal pyelectasis diagnosed antenatally. Journal of obstetrics and gynaecology. 2005;25(2):119-22.
4. Tosun M, Ozdes EK, Malatyalioglu E, Yavuz E, Celik H, Bildircin FD, et al. Long-Term Outcome of Fetuses with Soft Marker and Without Genetic or Structural Abnormality. The Journal of Obstetrics and Gynecology of India. 2019;69(1):56-61.
5. Damen-Elias HA, Luijnenburg SE, Visser GH, Stoutenbeek PH, de Jong TP. Mild pyelectasis diagnosed by prenatal ultrasound is not a predictor of urinary tract morbidity in childhood. Prenatal diagnosis. 2005;25(13):1239-47.
6. Signorelli M, Cerri V, Taddei F, Groli C, Bianchi UA. Prenatal diagnosis and management of mild fetal pyelectasis: implications for neonatal outcome and follow-up. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2005;118(2):154-9.
7. Scott J, Wright B, Wilson G, Pearson I, Matthews J, Rose P. Measuring the fetal kidney with ultrasonography. British journal of urology. 1995;76(6):769-74.
8. Blachar A, Blachar Y, Livne PM, Zurkowski L, Pelet D, Mogilner B. Clinical outcome and follow-up of prenatal hydronephrosis. Pediatric Nephrology. 1994;8(1):30-5.
9. Chudleigh P, Chitty L, Pembrey M, Campbell S. The association of aneuploidy and mild fetal pyelectasis in an unselected population: the results of a multicenter study. Ultrasound in obstetrics & gynecology. 2001;17(3):197-202.
10. Steer P. The epidemiology of preterm labour. BJOG: An International Journal of Obstetrics & Gynaecology. 2005;112:1-3.
11. Rand L, Robinson JN, Economy KE, Norwitz ER. Post-term induction of labor revisited. Obstetrics & Gynecology. 2000;96(5):779-83.
12. Mills JL, Simpson JL, Driscoll SG, Jovanovic-Peterson L, Van Allen M, Aarons JH, et al. Incidence of spontaneous abortion among normal women and insulin-dependent diabetic women whose pregnancies were identified within 21 days of conception. New England Journal of Medicine. 1988;319(25):1617-23.
13. Udosen A, Glen E, Ogbudu S, Nkposong E. High birth weight babies: Incedence and foetal outcome in a Mission Hospital in Benin City, Nigeria. Nigerian journal of clinical practice. 2006;9(2):114-9.
14. Coco C, Jeanty P. Isolated fetal pyelectasis and chromosomal abnormalities. American journal of obstetrics and gynecology. 2005;193(3):732-8.
15. Wax JR, Cartin A, Pinette MG, Blackstone J. Does the frequency of soft sonographic aneuploidy markers vary by fetal sex? Journal of ultrasound in medicine. 2005;24(8):1059-63.
16. Jaswon MS, Dibble L, Puri S, Davis J, Young J, Dave R, et al. Prospective study of outcome in antenatally diagnosed renal pelvis dilatation. Archives of Disease in Childhood-Fetal and Neonatal Edition. 1999;80(2):F135-F8.
17. Nguyen HT, Benson CB, Bromley B, Campbell JB, Chow J, Coleman B, et al. Multidisciplinary consensus on the classification of prenatal and postnatal urinary tract dilation (UTD classification system). Journal of pediatric urology. 2014;10(6):982-98.