What should be the criteria of renal pelvic dilatation in fetal anomaly screening?

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ABSTRACT

Background: Different classification systems are used for diagnosing the renal pelvic dilatation in the fetus using imaging techniques in the antenatal period. The most commonly used parameter for the diagnosis of renal pelvic dilatation is the anteroposterior diameter (APD) of the renal pelvis in the transverse plane. **Objectives:** The objectives of this study are to compare the measurements of the renal pelvic dilatation in fetuses with the measurements reported in the literature together with their short-term follow-up results in the postnatal period. **Materials and Methods:** The infants were included in the study if they were consulted with the pediatric surgery clinic due to the diagnosis of renal pelvic dilatation detected by measuring the APD of the renal pelvis in the transverse plane during an ultrasound examination when their mothers were screened for detecting fetal anomalies between July 2017 and February 2018 at the perinatology clinic. **Results:** The postnatal ultrasound examination, conducted for monitoring purposes, revealed that 82.7% (n=57) of the infants diagnosed with a dilatation of the renal pelvis had regression or resolution of the renal pelvic dilatation; however, it was observed that it persisted in the postnatal period in 17.3% (n=12) of the patients. The classification of the renal pelvic dilatation in 47 fetuses diagnosed during the screening for fetal anomalies in the second trimester of pregnancy showed that 41 (87.2%) of them were classified as mild, 5 (7.2%) of them were classified as moderate, and 1 (1.4%) of them was classified as severe. **Conclusion:** Based on the findings of measurements performed in the pregnant women screened at our hospital, this study reported the measurements of the renal pelvic dilatation in fetuses and compared the results reported in the literature together with their short-term follow-up results in the postnatal period.

Key words: *Anteroposterior diameter, Fetal anomaly, Renal pelvis dilatation*

Dilatation of the renal pelvis is one of the most common fetal anomalies diagnosed with an ultrasound examination performed in the antenatal period. It is reported that it is observed in approximately 1–5% of all pregnancies [1-3]. Dilatation of the renal pelvis can be unilateral or bilateral. However, it is more commonly unilateral [2,4,5]. It is 2.5 times more common in males than females [6]. Various classification systems are used for the diagnosis of renal pelvic dilatation in the fetus in the antenatal period [7]. The most commonly used parameter for the diagnosis of renal pelvic dilatation is the measurement of anteroposterior diameter (APD) of the renal pelvis in the transverse plane [8].

MATERIALS AND METHODS

This study was conducted between July 2017 and February 2018 at the perinatology and pediatric surgery clinic of a tertiary care hospital. Infants were included in this study if they were consulted with the pediatric surgery clinic due to the diagnosis of renal pelvic dilatation detected on maternal ultrasonographic examination. These were detected when their mothers were screened for detecting fetal anomalies by measuring the APD of the renal pelvis in the transverse plane with an ultrasonographic examination.

The measurement of APD of the renal pelvis in the transverse plane was performed using a GE Voluson E6 BT 17 (Zipf Austria) ultrasound device by the same physician who was a perinatal specialist. The fetuses were included in the evaluation if they had an APD of the renal pelvis of at least 5 mm measured in the transverse plane with ultrasonography. The results were classified as mild, moderate, or severe based on the measurements of the APD of the kidney in the transverse plane [9].

RESULTS

A renal pelvic dilatation was detected by evaluating the APD of the renal pelvis in the transverse plane with ultrasonography in 69 (1.6%) fetuses of 4216 pregnant women screened for detecting fetal anomalies. The median age of screened pregnant women was 28.7 years. The fetal anomaly screening was performed in the second and third trimesters of pregnancies in 47 (68.1%) and 22 pregnant women (31.9%), respectively. The renal pelvic dilatation was unilateral in 50% of the fetuses, and it was bilateral in the remaining 50%. The ultrasound examination performed for monitoring purposes in the postnatal period showed that the dilatation of the renal pelvis regressed or resolved in 82.7% (n=57) of the infants who were diagnosed with a renal pelvic dilatation in

the antenatal period during the screening of the pregnant women for fetal anomalies.

The renal pelvic dilatation persisted in 17.3% (n=12) of the infants with renal pelvic dilatation during the follow-up period. When the results of the measurements of the renal pelvic dilatations in 47 fetuses who were diagnosed during the pregnancy screening in the 2nd trimester were classified, it was found out that the renal pelvic dilatation was mild in 41 (87.2%) of the fetuses, it was moderate in 5 (7.2%) fetuses, and it was severe in one (1.4%) fetus. Of the 22 fetuses diagnosed in the third trimester, 17 were classified as mild, 3 (13.6%) were classified as moderate, and 2 (9%) were classified as severe.

In addition to the dilatation of the renal pelvis, infants with renal pelvic dilatation were found to have other anomalies including ventricular septal defect in two infants, omphalocele in one infant, choroid plexus cyst in one infant, and rocker bottom foot in one infant. In addition, of the infants diagnosed with renal pelvic dilatation, two had a unilateral polycystic kidney, two had a unilateral renal agenesis, and two had a unilateral bifid pelvis. Of the 11 patients who were followed up in the postnatal period, three infants underwent a pyeloplasty. The other patients are still being followed up.

DISCUSSION

In our study performed in our clinic, the incidence of renal pelvic dilatation in the fetuses was found to be 1.6% in the population of pregnant women who underwent screening to detect fetal anomalies. In the studies reported in the literature, the rate of detection of the renal pelvic dilatation was 1—4.5% during the screenings performed in populations of pregnant women for the detection of fetal anomalies. In the literature, the diagnosis of the dilatation of the renal pelvis is categorized into three groups based on the measurements of the APD of the renal pelvis in the transverse plane by ultrasonography. According to this classification, in the second trimester, measuring a diameter of 5–6 mm constitutes the mild-risk group, 7–10 mm the moderate-risk group, and 10 mm the high-risk group; in the third trimester, 7–9 mm constitutes the mild-risk group, 10–15 mm the moderate-risk group, and a diameter larger than 15 mm the high-risk group.

Several studies are available in the literature reporting that the rate of identifying renal pelvic dilatation reaches up to 18% in the pregnant population when the cutoff value is 3 mm for the diagnosis of renal pelvic dilatation [13,14]. Chudleigh et al. found an incidence of 0.7% and all cases were considered to be in the low-risk group [14]. In regard to the prevalence of renal pelvic dilatation, Ahmad et al. reported similar findings in pregnant women. The results of our study are in the range of figures reported for the incidence of identifying renal pelvic dilatation reported in the literature [15]. The different results in the observed frequencies of this finding in the literature are due to the different cutoff values.

The accepted cutoff value was 5 mm in our study. There are studies in the literature that accept similar cutoff values [10-12,15]. The UK Fetal Medical Association advocates a 5-mm cutoff value. The UK National Health Screening Program describes the values above 7 mm as renal pelvic dilatation [15]. There is a divergence in the opinions of radiologists and pediatric urologists in the evaluation of renal pelvic dilatation. A multidisciplinary summit was held in the US in 2014 on diagnosing the renal pelvic dilatation, describing the cutoff value as 4 mm in the 16–27th weeks of pregnancy similar to the results of the Society for Fetal Urology [7]. However, the specificity of a cutoff value of 4 mm is relatively lower in identifying renal pelvic dilatation, leading to unnecessary concerns in the future mothers and their families.

A renal pelvic dilatation was identified in 1.6% of the pregnant women included in our study. Of the fetuses diagnosed with a dilatation of the renal pelvis, only 14.4% were in the moderate - and severe-risk groups. In our study, it was determined that the renal pelvic dilatation was regressed or resolved in 82.7% of the infants in the mild-risk group as observed in the ultrasonographic examinations performed for monitoring purposes. The results are consistent with our results [15]. The results of a multicenter study conducted by Longpre et al. in 2012 and of a large-scale study conducted by Lee et al in 2014 reported similar results with those of our study. In our study, only three infants with severe renal pelvic dilatation were operated due to the failure of regression during the postnatal follow-up examinations. The relatively lower rate observed in our study may result from the following factors including the retrospective design of our study, different follow-up intervals, and conduct of postnatal follow-up examinations of the infants in the moderate- and high-risk groups at external diagnostic centers.

The following factors are the limitations of our study including the relatively shorter follow-up period, the failure to collect the results from all pregnant women included in the screening, the conduct of the study at a single center, and the failure of having ultrasound examinations performed for all infants in the postnatal period. In the postnatal period, it is more likely to observe regressions in the renal pelvic dilatations in the mild group identified by the measurements performed in the third trimester of the pregnancy in the antenatal period [15,16].

CONCLUSION

A cutoff value of 5 mm is a valid value for the diagnosis of renal pelvic dilatation during the second trimesters. It is critical to provide consultations for the parents about further diagnostic tests when the renal pelvic dilatation persists.

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