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Original Article

Ultrasonographic Assessment of Frequency of Maternal Hydronephrosis During Second and Third Trimester of Pregnancy

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ABSTRACT

The increasing occurrence of maternal hydronephrosis is causing concern across the world. Hydronephrosis during pregnancy is graded by using sonographic techniques. **Objective:** On ultrasonography, determine the consistency of maternal hydronephrosis during the second and third trimesters of pregnancy. **Methods:** A descriptive study was done at the Gilani Ultrasound center. There were following variables; trimesters, a baby's weight and three grades of hydronephrosis (Mild, Moderate and Severe). The data was collected based on these variables (Right, left). Pregnant women with kidney disease and without kidney disease were preferred. Pregnant women of all ages who are in their second and third trimesters of pregnancy are included in this study. Pregnant women in their first trimester and people with kidney problems were not included in the study. Toshiba and XARIO ultrasound machines and convex probe were used. SPSS version 21.0 was used to analyze the data.**Results:** With the standard deviation of 4.26, minimum 18.00, maximum 41.00 and mean of 6.85 out of 139 pregnant females were included according to age in this study. 68 (48.9%) out of 139 were without hydronephrosis and 71 (51.1%) were with hydronephrosis. Out of 139 pregnant females 18(25.4%) had moderate hydronephrosis, 53(74.6%) had mild hydronephrosis. According to laterality 2 (2.8%) pregnant females had bilateral hydronephrosis 20(28.2%) had left sided hydronephrosis and 48(67.6%) had right sided hydronephrosis. During 3rd trimester 44(62.0%) and during 2nd trimester 27(38.0%). According to fetal lie 11(15.5%) were transverse and 60(84.5%) were longitudinal. According to fetal position 46 (64.8%) were cephalic and 25 (35.2%) were breech **Conclusion:** According to the findings, hydronephrosis is more common in the third trimester than in the second trimester. Mild hydronephrosis is more common than moderate and severe hydronephrosis.

INTRODUCTION

By definition hydronephrosis is the dilatation of collecting system, regression of dilatation occurs within several weeks postpartum[1]. USG is the best modality of choice that is used in diagnosing illness in pregnant females. During pregnancy it is normal that mother may suffer from infections, these infections can occur in pregnant or non-pregnant patients[2]. Dilatation of the pelvicalyceal system can be seen initial phase of pregnancy, then it progresses in the later phases[3]. Often hydronephrosis happens in second trimester. One of its pathogenesis is smooth muscle relaxation due to mechanical tension of uterus[4]. Reason for the dilatation of pelvicalyceal system can be obstructive or non-obstructive[5]. The reason for structural and functional variation of kidneys can be due to problems in voiding[6]. Fetal urology society (SFU) has explained the grading system for hydronephrosis as such no hydronephrosis i.e Grade 0, dilatation of renal pelvis alone is Grade 1, dilatation of few of the calyces plus grade 1 is classed as Grade 2, grade 2 plus dilatation of all the calyces is classed as Grade 3, grade 3 plus parenchymal

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thinning is graded as Grade 4 [7]. Laterality of hydronephrosis depends on dilatation of the renal pelvicalyceal due to aseptic filling of urine and can be in one or both kidneys [10]. Manifestation of hydronephrosis is usual in first time pregnant females and mostly seen in right kidney and ureter [9]. 0.2-3% pregnant females may suffer intense hydronephrosis [10]. Effect of its pressure is more remarkably seen 2-3 times more on right side than on left [11]. Abdominal pain during pregnancy can be due to severe hydronephrosis [12]. In the assessment of flank pain radiologist should consider UTI and blockade in urinary tract due to a stone [13]. Tumors, calculi in the ureter or bladder can be one of the causes of hydronephrosis [14]. Best modality of choice is ultrasonography which is quite sensitive in the assessment of kidneys and hydronephrosis [15]. Obstructive uropathies can reliably diagnosed with Ultrasound [16]. During pregnancy best modality is ultrasound imaging because it is easily available, not invasive and is economical [17]. Aim of this study is to assess frequency of hydronephrosis in pregnant females during 2nd and 3rd trimester. Though it's a common finding on ultrasound but if hydronephrosis in pregnant females is ignored, damage could be severe. If not diagnosed during pregnancy it may cause severe damage to the mother.

METHODS

A descriptive study was done at the Gilani Ultrasound center. There were following variables; trimesters, a baby's weight and three grades of hydronephrosis (Mild, Moderate and Severe). The data was collected based on these variables (Right, left). Pregnant women with kidney disease and without kidney disease were preferred. Pregnant women of all ages who are in their second and third trimesters of pregnancy are included in this study. Pregnant women in their first trimester and people with kidney problems were not included in the study. Toshiba and XARIO ultrasound machines and convex probe were used. SPSS version 21.0 was used to analyze the data. Consent forms will be Received and reviewed prior to meeting participants. Patient couch will be prepared (sheets, patient privacy) and positioned in supine, left and right decubitus according to scanning requirement. Curvilinear transducer with frequency of 2-3 MHz will be used. Copious amount of gel will be used. Scanning will be done in transverse, longitudinal and oblique dimensions. Maternal kidneys will be scanned to measure the grades of maternal hydronephrosis.

RESULTS

With the standard deviation of 4.26, minimum 18.00, maximum 41.00 and mean of
6.85 out of 139 pregnant females were included according to age in this study.68 (48.9%) out of 139 were without hydronephrosis and 71 (51.1%) were with hydronephrosis. Out of 139 pregnant females 18(25.4%) had moderate hydronephrosis, 53(74.6%) had mild hydronephrosis. According to laterality 2 (2.8%) pregnant females had bilateralhydronephrosis 20(28.2%) had left-sided hydronephrosis and 48 (67.6%) had right sided hydronephrosis. During 3rd trimester 44(62.0%)and during 2nd trimester 27 (38.0%). According to fetal lie 11 (15.5%) were transverse and 60(84.5%) were longitudinal. According to fetal position 46(64.8%)were cephalic and 25 (35.2%) were breech. Out of 139 pregnant females, 71 (100.0%)were presented with hydronephrosis out of which 60 (84.5%) longitudinal and 11 (15.5%) transverse (Table 1). Out of 139 pregnant females,71(51.1%)were presented with hydronephrosis, out of which 53 (58.2%) were within 18-28 age group, 18 (39.1%) within 29-38 age group, 0(0.0%) were within age group of 39-48(Table 2).

			Fetal lie		Total
			Longitudinal	Transverse	
Hydron-ephrosis	No	Count	64	4	68
		% within hydronephrpsis	94.1%	5.9%	100%
	Yes	Count	60	15	71
		% within hydronephrpsis	84.5%	10.8%	100%
Total		Count	124	15	139
		% within hydronephrpsis	89.2%	10.8%	100%

Table 1: Cross tabulation between hydronephrosis and fetal lie hydronephrosis * fetal lie Cross tabulation

			Hydronephrosi		Tota
			no	Yes	
Age Group	18-28	Count	38	53	91
		% within AG	41.8%	58.2%	100.0%
	29-38	Count	28	18	46
		% within AG	60.9%	39.1%	100.0%
	39-48	Count	2	0	2
		% within AG	100.0%	0.0%	100.0%
Total		Count	68	71	139
		% within AG	48.9%	51.1%	100.0%

Table 2: Cross tabulation between hydronephrosis and age group, Age Group * hydronephrosis Cross tabulation

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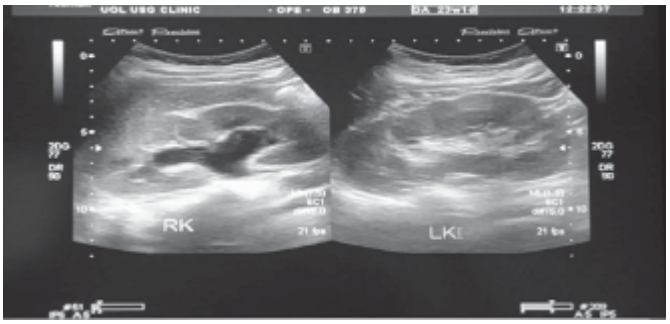

Figure 1: Appearance shows pregnant woman of 2nd trimester with moderate hydronephrosis

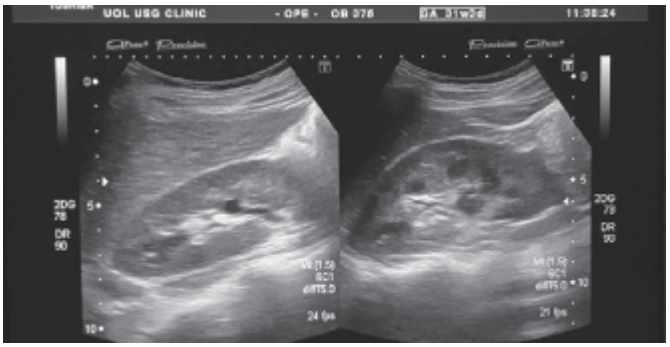

Figure 2: Appearance shows pregnant woman of 3rd trimester with mild hydronephrosis

DISCUSSION

The incidence of maternal hydronephrosis throughout the second and third trimesters of pregnancy was investigated using ultrasonography. The inclusion criteria were set to include pregnant women based on diagnostic performance. This study comprised 139 individuals, with 71 (51.1%) having hydronephrosis and 68 (48.9%) not having hydronephrosis, 53 (38.1%) having mild hydronephrosis, and 18 (12.9%) having moderate hydronephrosis. Right hydronephrosis affected 48 (34.5%) of the patients, whereas left hydronephrosis affected 20 (14.4%) of the patients, and bilateral hydronephrosis affected two (1.4%) of the patients. A longitudinal fetal lying was found in 124 (89.2%) of the cases, and 15 (10.8%) of the cases. A breech fetal position was found in 41 (29.5%) of the cases, whereas a cephalic fetal position was found in 98 (70.5%). We reviewed this study by Woo JS et al. in this review 56 asymptomatic pregnant females in longitudinal report during third trimester of pregnancy was assessed, progression of physiological hydronephrosis and ultrasound estimate the calyceal width. Evaluation based framework was mostly used; 89% of the patients presented a predominantly gentle dilation before childbirth. Right side was affected by prevalence of hydronephrosis. There was an extreme dilatation evident in 6 patients (10.7%) had all its characteristics as of second trimester. During second trimester there was less prevalence of moderate dilatation but more privileged to progression of moderate or severe dilatation. In the third trimester it was not normal for moderate dilatation to progress in second half of pregnancy. During pregnancy the onset of hydronephrosis helps to find the mechanical hypothesis [18]. This study was conducted by Watson, W et al. in this study, in each trimester and postpartum 81 gravidas were evaluated by ultrasound. Before performing renal ultrasound of pregnant females everyone had asked the following question about symptoms of flank pain. Hydronephrosis was defined as average pelvic calyx measurement of 10mm or greater. This study shown that all maternal hydronephrosis was seen initially in the third trimester none of the cohort had hydronephrosis in the first trimester, and four had hydronephrosis in the second trimester. Out of seventeen (21%) of 81 pregnant females had reported hydronephrosis, three of them were bilateral and fourteen were presented with right sided hydronephrosis [19]. This study was proposed by Anderson IH et al. In this study, for hydronephrosis 100 consecutive patients were examined who were presented for gestational ultrasound evaluation. Incidence, degree, laterality, and relationship to the stage of pregnancy of hydronephrosis in these patients was assessed. Half of the patients had hydronephrosis, second and third trimesters in particular. Right sided hydronephrosis was more common than left [20]. Siyal A et al proposed this study. During pregnancy the incidence of maternal hydronephrosis was determine on left or right side of the kidney. Hydronephrosis was found in 500 pregnant females which were examined with ultrasonography. Patient with left side hydronephrosis 97 (30.21%), with right side hydronephrosis 224 (69.78%) out of 321 patients which had shown hydronephrosis. Maternal ureters on either the right or left side had shown no fetal spine compression effect. Regardless of position of supine on percentage [21].

CONCLUSION

According to the findings, hydronephrosis is more common in the third trimester than in the second trimester. Mild hydronephrosis is more common than moderate and severe hydronephrosis.

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