

Hydronephrosis in Pregnancy: A Comparative Study of Tribals and Non Tribals

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ABSTRACT

Introduction: There is varying degree of dilatation of maternal pelvicalyceal system during different stages of pregnancy. The extent of dilatation depends on the gestational age as well as parity. These changes are more evident on the right side than on the left side. This study was done to see whether there is any difference in the degree of hydronephrosis in tribal and non tribal group.

Material and methods: This study was carried out in Chandrama Imaging and Health Care at Ranchi between November 2014 to September 2015. A total of sixty pregnant women (thirty each of tribal and non tribal group) were studied.

Result: In the tribal group at 36 weeks 25 patients had hydronephrosis in right kidney while 7 patients had hydronephrosis in left kidney. In the non tribal group at 36 weeks 25 patients had hydronephrosis in right kidney while 10 patients had hydronephrosis in left kidney. Hydronephrosis completely resolved in all patients at 6 weeks postpartum.

Conclusion: This study shows that there is varying degree of hydronephrosis during pregnancy which is more marked on the right side. The difference in the degree of hydronephrosis between tribal and non tribal groups is not significant.

Keywords: Pelvicalyceal system, ureter, gravid uterus, primigravida.

INTRODUCTION

There is varying degree of dilatation of maternal pelvicalyceal system during different stages of pregnancy. These changes are more evident on the right side than on the left side. Exact cause is not known but a number of factors have been suggested to have a role in dilatation of pelvicalyceal system during pregnancy. These are:

- Hormonal factors^{1,2}: Progesterone causes relaxation of ureteric smooth muscle.
- Obstructive factors³: Compression of ureter between enlarged uterus and bones of pelvic inlet. Hydronephrotic changes are more marked in the right side is due to obliquity of uterine axis. The less obstructive changes seen in the left kidney and ureter is due to cushioning of the left pelvic ureter at the inlet by sigmoid colon interposed between ureter and uterus.
- Dilated iliac vessels⁴: Enlarging uterus compress iliac vessels resulting in their dilatation. Dilated iliac vessels may compress ureters resulting in dilatation of pelvicalyceal system.
- Hydronephrosis during pregnancy is more marked in primigravida than multigravida possibly because of more lax musculature in multigravida.

With ultrasound there are no known harmful effects to mother or fetus. So repeated examinations of maternal kidneys can be done for serial follow up. Moreover the two kidneys

can be compared for any difference in the degree of hydronephrosis.^{4,5}

In many diseases, considerable difference in the incidence has been observed among different racial groups. Ranchi is a town of mixed population having a fair population of both tribal and non tribal population. Thus in Ranchi a comparative study between tribals and non tribals could be easily done. This study was done to see whether there is any difference in the degree of hydronephrosis in tribal and non tribal group.

MATERIAL AND METHODS

This study was carried out in Chandrama Imaging and Health Care at Ranchi between November 2014 to September 2015. A total of sixty pregnant women (thirty each of tribal and non tribal group) were studied.

Selection Criteria:

- Only primigravida were selected.
- There should be no previous history suggestive of renal disease.
- Whenever possible they were recruited before the end of first trimester.
- Each case gave informed consent to undergo monthly nephrosonography during pregnancy and in puerperium.

Equipment: The nephrosonograms were obtained using a G-50 Siemens model real time sector scanner and a 3.5 MHz transducer. A water soluble gel was used to facilitate conductivity of ultrasound waves.

Frequency of scans: Nephrosonography was performed as near as possible to 12, 28 and 36 weeks of gestation, as well as 48 hours and 6 weeks after delivery.

Assessment of renal tract dilatation^{5,6}: the degree of renal tract dilatation was divided into four categories:

- Grade 1: No change: Absence of visible urine in the renal pelvis in both the longitudinal plane or transverse planes.
- Grade 2: Urinary stasis: slight separation of renal pelvis seen on longitudinal plane or transverse plane or

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both.

Grade 3: Hydronephrosis: Marked dilatation of the renal pelvis with wide separation of renal pelvis in longitudinal and transverse planes.

Grade 4: Hydronephrosis with calyceal clubbing: Dilatation of renal pelvis to a degree to cause filling and clubbing of major and minor calyces.

Renal function tests: Base line blood urea and serum creatinine were done in all patients. Repeat tests were done only in those cases which showed hydronephrosis. The tests were repeated at the time of nephrosonography.

STATISTICAL ANALYSIS

SPSS version 21 was used to generate tables. Descriptive statistics were used to infer results.

RESULT

The tribal group had more cases in lower age group. 44% of cases were less than 20yrs of age while in non tribal group 16% were less than 20 yrs. Most of the tribal cases were from rural area(64%) while in non tribal group 48% of patients were from rural area.

The findings of both the right and the left kidneys for both

groups were recorded separately and compared for any significant difference between tribal and non tribal groups. The difference between pelvicalyceal dilatation of the right and left kidneys were compared within each group separately. Any association of degree of hydronephrosis and alteration in renal function test was also analysed.

In the tribal group at 36 weeks 25 patients had hydronephrosis (grade 3 and 4) in right kidney while 7 patients had hydronephrosis (grade 3 and 4) in left kidney. Hydronephrosis completely resolved in all patients at 6 weeks postpartum. (Table 1 and 2)

In the non tribal group at 36 weeks 25 patients had hydronephrosis (grade 3 and 4) in right kidney while 10 patients had hydronephrosis (grade 3 and 4) in left kidney. Hydronephrosis completely resolved in all patients at 6 weeks postpartum. (Table 3 and 4)

DISCUSSION

The present study shows that there is varying degree of hydronephrosis during pregnancy. Ultrasonographic study of pelvicalyceal system during pregnancy was done in the past by many workers including A.M. Fried⁵, S.L. Peake et al⁷, K.A Cietak and J.R Newton.⁸ K.A Cietak and J.R New-

Gestation (weeks)	No change	Stasis	Hydronephrosis	Hydronephrosis with clubbing
12	23(76.66%)	7(23.33%)	0(0.0%)	0(0.0%)
16	15(50%)	13(43.33%)	2(6.66%)	0(0.0%)
20	6(20%)	21(70%)	3(10%)	0(0.0%)
24	3(10%)	11(36.66%)	12(40%)	1(3.3%)
28	2(6.66%)	8(26.66%)	11(36.66%)	9(30%)
32	2(6.66%)	7(23.33%)	10(33.33%)	11(36.66%)
36	1(3.33%)	6(20.00%)	9(30.1%)	14(46.66%)
48 hrs postpartum	5(16.66%)	13(43.33%)	5(16.66%)	7(23.33%)
6 weeks postpartum	11(36.66%)	19(63.33%)	0(0.0%)	0(0.0%)

Table-1: Changes in the right kidney in tribal group during pregnancy

Gestation(weeks)	No change	Stasis	Hydronephrosis	Hydronephrosis with clubbing
12	25(83.33%)	5(16.66%)	0(0.0%)	0(0.0%)
16	23(76.66%)	7(23.33%)	0(0.0%)	0(0.0%)
20	14(46.66%)	16(53.33%)	0(0.0%)	0(0.0%)
24	14(46.66%)	12(40%)	4(13.33%)	0(0.0%)
28	7(23.33%)	18(60%)	4(13.33%)	1(3.33%)
32	3(10%)	19(63.33%)	5(16.66%)	3(10.00%)
36	3(10%)	20(66.66%)	4(13.33%)	3(10.00%)
48 hrs postpartum	6(20%)	21(70%)	1(3.33%)	2(6.66%)
6 weeks postpartum	19(63.33%)	11(36.66%)	0(0.0%)	0(0.0%)

Table-2: Changes in left kidney in the tribal group during pregnancy.

Gestation(weeks)	No change	Stasis	Hydronephrosis	Hydronephrosis with clubbing
12	23(76.66%)	7(23.33%)	0(0.0%)	0(0.0%)
16	16(53.33%)	12(40%)	2(6.66%)	0(0.0%)
20	4(13.33%)	21(70%)	5(16.66%)	0(0.0%)
24	3(10%)	14(46.66%)	11(36.66%)	2(6.66%)
28	2(6.66%)	7(23.33%)	12(40.00%)	9(30%)
32	2(6.66%)	4(13.33%)	11(36.66%)	13(43.33%)
36	2(6.66%)	3(10.00%)	10(33.33%)	15(50%)
48 hrs postpartum	4(13.33%)	14(46.66%)	4(13.33%)	8(26.66%)
6 weeks postpartum	14(46.66%)	16(53.33%)	0(0.0%)	0(0.0%)

Table-3: Changes in the right kidney in non tribal group during pregnancy

Gestation(weeks)	No change	Stasis	Hydronephrosis	Hydronephrosis with clubbing
12	25(83.33%)	5(16.66%)	0(0.0%)	0(0.0%)
16	22(73.33%)	8(26.66%)	0(0.0%)	0(0.0%)
20	12(40%)	18(60%)	0(0.0%)	0(0.0%)
24	13(43.33%)	13(43.33%)	4(13.33%)	0(0.0%)
28	4(13.33%)	18(60%)	6(20.00%)	2(6.66%)
32	2(6.66%)	19(63.33%)	5(16.66%)	4(13.33%)
36	2(6.66%)	18(60.00%)	6(20.00%)	4(13.33%)
48 hrs postpartum	11(36.66%)	16(53.33%)	1(2.22%)	2(6.66%)
6 weeks postpartum	18(60%)	12(40%)	0(0.0%)	0(0.0%)

Table-4: Changes in the left kidney in non tribal group during pregnancy

ton⁸ had done a longitudinal study of pelvicalyceal system changes during pregnancy which showed a similar result. This study shows that degree of hydronephrosis increases with increasing gestational age and hydronephrosis regresses rapidly after delivery which suggest the importance of uterine compression in causing hydronephrosis, indicating compression by gravid uterus as a major cause of hydronephrosis during pregnancy. R.A Rubi and N. L Sala⁹ also suggested compression by gravid uterus as a major cause of hydronephrosis during pregnancy.

Hydronephrosis is more marked on the right side. The reason may be dextrorotation of enlarged gravid uterus or compression by the engorged ovarian veins or iliac vessels. D.W Warrell¹⁰ suggested that differences between right and left sides may be explained by pressure from right ovarian vein which crosses the ureter while on the left side the ovarian vein runs parallel to ureter.

All patients selected for this study were primigravida, as some of the previous studies have shown the effect of parity on the degree of hydronephrosis. C.S Dawn (textbook of obstetrics and neonatology)¹¹ stated that hydronephrosis during pregnancy is little more pronounced in primigravida than in multigravida.

In addition this study also compared the degree of dilatation of pelvicalyceal system during pregnancy between tribal and non tribal population of Ranchi.

CONCLUSION

This study clearly shows that there is varying degree of hydronephrosis during pregnancy which is more marked on the right side. The degree of hydronephrosis depends on gestational age. The difference in the degree of hydronephrosis between tribal and non tribal groups is not significant.

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