ORIGINAL ARTICLE

Frequency of Factors Leading to Oligohydramnios in Patients Presenting to Women and Children Hospital, Dera Ismail Khan

FARYAL SHAH[1], MARIA GHAFOOR[2], NAJMA BIBI[2], AIMEN SALEEM[2], RUBINA BABAR[2], ABEELA AZAM[3]
[1]Trainee Medical Officer, Women and Children Hospital, Dera Ismail Khan
[2]Assistant Professor, Gomal Medical College, Dera Ismail Khan
[3]Women Medical Officer, Women and Children Hospital, Dera Ismail Khan
Corresponding author: Maria Ghafoor, Email: marvelousme85@yahoo.com

ABSTRACT

Objective: To determine the frequency of factors leading to oligohydramnios in patients presenting to women and children hospital, Dera Ismail Khan.

Materials and methods: This cross sectional study was conducted in obstetrics and gynecology department, Women and children teaching hospital Dera Ismail khan from 1 August, 2020 to 31 January, 2021, comprising 185 patients. Sampling technique used was convenient non-probability sampling. Factors leading to oligohydramnios (Primigravida, history of abortion, gestational age > 40 weeks, history of UTI and history of high blood pressure) were noted as per operational definition and recorded on especially designed proforma.

Result: A total of 185 pregnant women with oligohydramnios were included in the study. Factors leading to oligohydramnios (Primigravida, history of abortion, gestational age > 40 weeks, history of UTI and history of high blood pressure) were noted. Age range in this study was from 18 to 35 years with mean age of 27.178±2.39 years and mean weight was 68.908±3.82 Kg. Factors leading to oligohydramnios were, primigravida 34.1%, History of Abortion 27%, gestational age > 40 weeks 45.4%, history of UTI 15.7% and history of high blood pressure was 21.1%.

Practical implication: This study will help the gynecologists in diagnosis and analysis of the oligohydramnios based on the risk factors discussed in this research.

Conclusion: It can be concluded from our study that most common associated factors were primigravida, history of abortion, gestational age > 40 weeks, history of UTI and history of high blood pressure.

Keywords: Amniotic fluid, Gestation, Hypertension, Pregnancy, Oligohydramnios, Primigravida.

INTRODUCTION

The amniotic fluid index is a standardized way to assess the sufficiency of amniotic fluid quantity in pregnancy[1, 2.] The amniotic fluid index is used in patients who are at least 24 weeks pregnant with a singleton gestation[3, 4]. Decreased fetal urine output can have a number of causes, which fall into two general categories: fetal urinary tract obstruction and decreased urine production by the fetal kidney[5]. Urinary tract obstruction can occur anywhere along the fetal urinary tract and can be catastrophic for the fetus[6]. Decreased urine production by the fetal kidney typically reflects inadequate blood flow to the fetal kidney, caused by shunting of fetal blood flow away from the kidney to the heart and brain. It is the same mechanism which causes oliguria in critically ill adults[7]. When the fetus receives adequate nutrients and oxygen from the placenta, blood is shunted away from the fetal kidney, glomerular filtration rate decreases, and urinary output decreases. Therefore, decreased amniotic fluid volume due to decreased urine production by the fetal kidney is a reflection of chronic hypo-perfusion of the fetus. Oligohydramnios can also occur because the patient's amniotic membrane has ruptured and amniotic fluid is leaking out of the uterus. Low amniotic fluid levels during the first or second trimester may associates with some fetal abnormalities. Several factors like leaky or ruptured amniotic membranes, fetal abnormalities, genetic factors, maternal illness, nutrition status, carrying twins, NSAIDs like indomethacin and certain ACE (angiotensin-converting enzyme) inhibitors may play a crucial role.

In a study by Dhakal RD, et al. has showed that frequency of Primigravida 53.6%, History of abortion 61.9%, gestational age > 40 weeks 66.7%, History of UTI 37.8% and History of high blood pressure was 66.7% in patients with Oligohydramnios[8]. Studies are deficient not only from Pakistan but also worldwide regarding factors leading to Oligohydramnios. Timely identification and treatment have been associated with improvement in some maternal and fetal/neonatal outcomes. When detected, clinical management of women with oligohydramnios can include amnioinfusion, early induction of labor and even cesarean delivery. However, gaps in knowledge remain, including the factors of oligohydramnios.

As the data available in the literature is not clearly defining the factors responsible for oligohydramnios in pregnant women, therefore we planned to investigate the frequency of factors leading to oligohydramnios and their consequences.

MATERIALS AND METHODS

Study design: This case control study was conducted in women and children hospital Dera Ismail Khan from 1 August 2020 to 31 January 2021.

Sample size: Sample size was 185 patients calculated with WHO sample size software using 95% confidence interval, 7% margin of error and expected prevalence of history of UTI = 37.8%. Sampling technique used was convenient non-probability sampling.

Ethical approval: Permission from ethical committee was taken. A detailed explanation about the participation in the study was given to the patient and informed consent was obtained explaining the risks and benefits in detail.

Study procedure and data collection: Factors leading to oligohydramnios (Primigravida, history of abortion, gestational age > 40 weeks, history of UTI and history of high blood pressure) were noted as per operational definition and recorded on especially designed proforma.

Data analysis: Data was analyzed with statistical analysis program (SPSS V. 22). Frequency and percentage was analyzed for qualitative variables like Primigravida, history of abortion, gestational age > 40 weeks, history of UTI and history of high blood pressure. Mean ±SD was presented for quantitative variables like age and weight. Effect modifiers like age and weight was controlled by stratification. Post stratification chi square test was applied p ≤0.05 was considered statistically significant.

RESULTS

Age range in this study was from 18 to 35 years with mean age of 27.178±2.39 years and mean weight was 68.908±3.82 Kg as shown in Table-1. Factors leading to oligohydramnios were, primigravida 34.1%, History of Abortion 27%, gestational age > 40 weeks 45.4%, history of UTI 15.7% and history of high blood pressure was 21.1% as shown in Table-2, 3, 4, 5 and 6 respectively. Stratification of factors with respect to age and weight are shown in Tables- 7, 8, 9, 10, 11, 12, 13, 14,15 and 16 respectively. The factor responsible for oligohydramnios in pregnant women were also analyzed and showed in Figure 1,

along with their incidence and frequency, whereby the most often associated factors were primigravida, followed by history of abortion, gestation over 40 weeks, history of UTIs and hypertension with the frequency of 34.1, 27, 45.4, 15.7 and 21.1%, respectively (Figure 1).

Table 1: Mean±SD of patients according to age and weight, n=185

S.No	Demographics	Mean±SD
1	Age(years)	27.178±2.39
2	Weight (Kg)	68.908±3.82

Table- 2: Frequency and %age of patients according to primigravida, n=185

Primigravida	Frequency	%age
Yes	63	34.1%
No	122	65.9%
Total	185	100%

Table-3: Frequency and %age of patients according to history of abortion, n=185

History of Abortion	Frequency	%age
Yes	50	27%
No	135	73%
Total	185	100%

Table-4: Frequency and %age of patients according to gestational age > 40 weeks, n=185

Gestational age > 40 weeks	Frequency	%age
Yes	84	45.4%
No	101	54.6%
Total	185	100%

Table-5: Frequency and %age of patients according to history of UTI, n=185

History of UTI	Frequency	%age
Yes	29	15.7%
No	156	84.3%
Total	185	100%

Table-6: Frequency and %age of patients according to history of high blood pressure, n=185

History of High Blood Pressure	Frequency	%age
Yes	39	21.1%
No	146	78.9%
Total	185	100%

Table-7: Stratification of primigravida with respect to age.

Age (years)	Primigravida (yes)	Primigravida (no)	p-value
18-30	63(36.6%)	109(63.4%)	0.007
>30	0(0%)	13(100%)	0.007
Total	63(34.1%)	122(65.9%)	0.007

Table-8: Stratification of primigravida with respect to weight.

Weight (Kg)	Primigravida (yes)	Primigravida (no)	p-value
<70	50(35.2%)	92(64.8%)	0.546
>70	13(30.2%)	30(69.8%)	0.546
Total	63(34.1%)	122(65.9%)	0.546

Table-9: Stratification of history of abortion with respect to age.

Age (years)	History of Abortion (yes)	History of Abortion (no)	p-value
18-30	42(24.4%)	130(75.6%)	0.004
>30	8(61.5%)	5(38.5%)	0.004
Total	50(27%)	135(73%)	0.004

Table-10: Stratification of history of abortion with respect to weight.

Weight (Kg)	History of Abortion (yes)	History of Abortion (no)	p-value
<70	37(26.1%)	105(73.9%)	0.589
>70	13(30.2%)	30(69.8%)	0.589
Total	50(27%)	135(73%)	0.589

Table-11: Stratification of gestational age > 40 weeks with respect to age.

Age (years)	Gestational age > 40 weeks (yes)	Gestational age > 40 weeks (no)	p-value
18-30	79(45.9%)	93(54.1%)	0.602
>30	5(38.5%)	8(61.5%)	0.602
Total	84(45.4%)	101(54.6%)	0.602

Table-12: Stratification of gestational age > 40 weeks with respect to weight

Weight (Kg)	Gestational age > 40 weeks (yes)	Gestational age > 40 weeks (no)	p-value
<70	64(45.1%)	78(54.9%)	0.868
>70	20(46.5%)	23(53.5%)	0.868
Total	84(45.4%)	101(54.6%)	0.868

Table-13: Stratification of history of UTI with respect to age.

Age (years)	History of UTI (yes)	History of UTI (no)	p-value
18-30	26(15.1%)	146(84.9%)	0.447
>30	3(23.1%)	10(76.9%)	0.447
Total	29(15.7%)	156(84.3%)	0.447

Table-14: Stratification of history of UTI with respect to weight.

Weight (Kg)	History of UTI (yes)	History of UTI (no)	p-value
<70	23(16.2%)	119(83.8%)	0.723
>70	6(14%)	37(86%)	0.723
Total	29(15.7%)	156(84.3%)	0.723

Table-15: Stratification of history of high blood pressure with respect to age.

Age (years)	History of High Blood Pressure (yes)	History of High Blood Pressure (no)	p-value
18-30	27(15.7%)	145(84.3%)	0.000
>30	12(92.3%)	1(7.7%)	0.000
Total	39(21.1%)	146(78.9%)	0.000

Table-16: Stratification of history of high blood pressure with respect to weight.

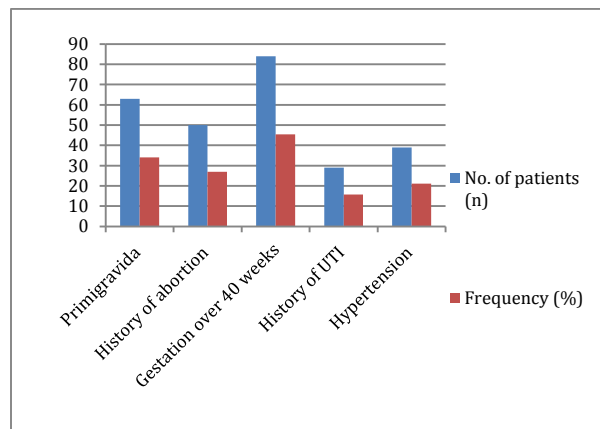| Weight (Kg)	History of High Blood Pressure(yes)	History of High Blood Pressure (no)	p-value
<70	25(17.6%)	117(82.4%)	0.035
>70	14(32.6%)	29(67.4%)	0.035
Total	39(21.1%)	146(78.9%)	0.035

Figure 1: Analysis of factors responsible for oligohydramnios

DISSCUSSION

Oligohydramnios is a relatively common complication of pregnancy and such case is often encounter in clinical practice[9]. It refers to amniotic fluid volume that is less than expected for gestational age. It is typically diagnosed by ultrasound examination and may be described qualitatively (e.g, normal, reduced) or quantitatively (e.g, amniotic fluid index [AFI] [10, 11]. Oligohydramnios is often to describe pregnancies with AFI[12]. Alternatively, some clinicians

prefer the single vertical pocket (SVP) with severe oligohydramnios defined as SVP less than 1 cm and mild oligohydramnios defined as SVP 1 to 2 cm[13]. An adequate volume of amniotic fluid is critical to allow normal fetal movement and growth, and to cushion the fetus and umbilical cord[14]. Reported rates of oligohydramnios are influenced by variations in diagnostic criteria, the population studied (low or high risk, screening or indicated ultrasound examination), the threshold used and the gestational age at the time of the ultrasound examination (preterm, term or post term) [15]. Oligohydramnios may inhibit these processes and can lead to fetal deformation, umbilical cord compression and death[16]. A study of 3050 uncomplicated pregnancies with singleton non-anomalous fetuses between 40 and 41.74 weeks of gestation noted oligohydramnios (defined as AFI less than 5) in 11 percent[17]. The incidence is high in laboring women, largely due to rupture of fetal membranes during or just before labor[18]. In the present study, majority of cases were in the age group 20 to 30 years, as compared to other age groups, reflecting the child bearing age of most of the women with the mean (±SD) maternal age of 27.178±2.39 years. Similar studies by Chauhan P et. al. [19], Jun Zhang et. al. [20] and Everett F et. Al. [21] found that the mean maternal age were 23.6 ± 6.5 years, 28.4 ± 3.4 years and 23.8 ± 5.7 years respectively. Studies by Jun Zhang et. al. [20], Casey B et al .[22], Everett F et. al. [21] and Iffath A et. al.[23] found that, the mean gestational age were 38.1 ± 3.3 weeks, 37.5 ± 2 weeks, 34.3 ± 2.1 weeks, and (mean ± SD) was 36.3 ± 2 weeks respectively. These findings indicate that the problem of oligohydramnios was more common in the later part of pregnancy. It is mainly due to physiological or pathological causes of reduced placental perfusion near term. In our study we have seen that primigravida was 34.1%, history of abortion 27%, gestational age > 40 weeks 45.4%, history of UTI 15.7% and history of high blood pressure was 21.1%. In a study by Dhakal RD, et al. has showed that frequency of Primigravida 53.6%, History of abortion 61.9%, gestational age > 40 weeks 66.7%, History of UTI 37.8% and History of high blood pressure was 66.7% in patients with Oligohydramnios.

CONCLUSION

It can be concluded from our study that most common associated factors were primigravida, history of abortion, gestational age > 40 weeks, history of UTI and history of high blood pressure.

REFERENCES

1. Madendag Y, Madendag IC, Sahin E, Aydin E, Sahin ME, Acmaz G. How well do the popular ultrasonic techniques estimate amniotic fluid volume and diagnose oligohydramnios, in fact? Ultrasound Q. 2019;35(1):35-8.
2. Cheung CY, Roberts VHJ, Frias AE, Brace RA. Effects of maternal western-style diet on amniotic fluid volume and amnion VEGF profiles in a nonhuman primate model. Physiol Rep. 2018;6(20):e13894.
3. Zhang Y, Yu Y, Chen L, Zhao W, Chu K, Han X. Risk factors of intraamniotic infection related to induction with single-balloon catheter: a casecontrol study. Gynecol Obstet Invest. 2019;84(2):183-9.
4. Berezowsky A, Ashwal E, Hiersch L, Yogev Y, Aviram A. Transient isolated polyhydramnios and perinatal outcomes. Ultraschall Med. 2019;40(6):749-56.
5. Krispin E, Berezowsky A, Chen R, Meizner I, Wiznitzer A, Hadar E, et al. Updating the amniotic fluid index nomograms according to perinatal outcome. J Matern Fetal Neonatal Med. 2020;33(1):113-9.
6. Kehl S. Single deepest vertical pocket or amniotic fluid index as evaluation test for predicting adverse pregnancy outcome (SAFE trial): a multicenter, open-label, randomized controlled trial. Z Geburtshilfe Neonatol. 2018;222(1):28-30.
7. Lee YJ, Kim SC, Joo JK, Lee DH, Kim KH, Lee KS. Amniotic fluid index, single deepest pocket and transvaginal cervical length: parameter of predictive delivery latency in preterm premature rupture of membranes. Taiwan J Obstet Gynecol. 2018;57(3):374-8.
8. Dhakal RD, PaudelD. Factors associated with oligohydramnios: age, hydration status, illnesses in pregnancy, nutritional status and fetal condition - a study from Nepal. Med Sci. 2017;5(2):26-31.
9. Brace RA. Physiology of amniotic fluid volume regulation. Clin Obstet Gynecol. 2013; 40(2):280-89.
10. Hedriana HL. Ultrasound measurement of fetal urine flow. Clin Obstet Gynecol. 1997; 40(2):337-51.
11. Cunninghham FG, Leveno KJ, Bloom SL, Hauth JC, Gilstrap III LC, Wenstorn KD. Williams Obstetrics, 23rd Edition McGRAW-HILL Medical Publishing Division 2010; 495-98.
12. Oosterhoof H, Haak MC, Arnoudes JG. Acute Maternal Rehydration increases the urine production rate in the near-term human fetus. Am J Obstet Gynecol. 2011; 183(1):226-29.
13. F. Gary Cunningham, Kenneth J. Leveno, Steven L. Bloom, et al. Williams's obstetrics. 24th edn. 2014.
14. Phelan JP, Smith CV, Broussard P, Small M. Amniotic fluid volume assessment using the four-quadrant technique in the pregnancy at 36-42 weeks gestation. J Reprod Med. 2013; 32(7):540-42.
15. Voxman EG, Tran S, Wing DA. Low amniotic fluid index as a predictor of adverse perinatal outcome. J Perinato. 2002;22(4):282-85.
16. Feldman I, Friger M, WiznitzerA, Mazor M, Holeberg G, Sheiner E. Is oligohydramnios more common during the summer season? Arch Gynecol Obstet. 2009;280(1):3-6
17. Elasandabesee D, Majumdhar S, Sinha S. Obstetricians' attitudes towards 'isolated' oligohydramnios at term. J Obstet and Gynecol. 2007; 27(6):574-76.
18. Magann EF, Chauhan SP, Doherty DA, Barrilleaux PS, martin JN, Morrison JC. Predictability of intrapartum and neonatal outcomes with the amniotic fluid volume distribution: a reassessment using the amniotic fluid index, single deepest pocket, and a dye-determined amniotic fluid volume. Am J Obstet Gynecol, 2003; 188(6):1527-28.
19. Chauhan SP, Hendrix NW: Intrapartum oligohydramnios does not predict adverse peripartum outcome among high risk parturient. Am Obstet Gynecol, 1997; 176(6):1130-1136.
20. Jun Zhang, James Troendle: Isolated oligohydramnios is not associated with adverse perinatal outcome. Int J Gynaecol Obstet Mar 2004;3:220-225.
21. Everett FM, Thomas EN: Measurement of amniotic fluid volume- Accuracy of ultrasonography technique. Am J Obstet Gynecol 1992; 16787.Casey Brian M, Donald D McIntire: Pregnancy outcomes after antepartum diagnosis of oligohydramnios at or beyond 34 weeks' gestation. Am J Obstet Gynecol, April 2000; 182(4): 909-912.
22. Hoskins IA, Friden FJ: Variable deceleration in reactive non stress test with decreased amniotic fluid index predicts fetal compromises. Am J Obstet Gynecol 1991; 165(4):1094-1098.:1533-7.
23. Iffath SM. Unusual presentation of molar pregnancy--a case report. Journal of Evolution of Medical and Dental Sciences. 2014 Feb 24;3(8):2073-6.