

Prevalence of Congenital Anomalies in Oligohydramnios: A Hospital Based Study in Western Nepal

KC S, Poudel R, Khadka S, Shrestha A

Department of Radiology and Imaging, Manipal Teaching Hospital, Pokhara, Nepal

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ABSTRACT

Introduction: Amniotic fluid serves as a cushion for growing fetus. Oligohydramnios is decreased amount of amniotic fluid and is associated with increased incidence of congenital anomalies. The aim of this study was to detect the prevalence of congenital anomalies in oligohydramnios

Methods: Singleton pregnancy irrespective of gestational age with amniotic fluid deepest vertical pocket (DVP) of less than two centimeters was included in the study. Grading of oligohydramnios was done as mild and severe. Detailed anomaly scan was done to look for any congenital malformations. Congenital anomalies were confirmed with post natal findings.

Results: There were 60 pregnant women with amniotic fluid index less than two centimeters with respect to deepest vertical pocket. Congenital anomalies were detected in 18.33% pregnant women with oligohydramnios. In patients with severe oligohydramnios 33.33% had congenital anomalies. Renal anomalies were the most common anomalies in our study followed by musculoskeletal anomalies. Central nervous system, gastrointestinal and cardiac anomalies were also common in association with oligohydramnios.

Conclusion: Our study showed that various congenital anomalies are associated with oligohydramnios and incidence of anomalies increases with increased severity of oligohydramnios. Hence, detailed ultrasound scan should be done to look for congenital malformations whenever oligohydramnios is encountered.

Key Words: Amniotic Fluid; Fetal Development; Gestational Age; Pregnancy

INTRODUCTION

Oligohydramnios is defined as amniotic fluid index of less than five centimeters measured in four quadrants or amniotic fluid volume deepest vertical pocket of less than two centimeters.^{1,2} The deepest vertical pocket (DVP) method for assessing amniotic fluid volume is preferred because clinical trial results have shown that defining

Correspondence to: Dr. Subash K.C
Department of Radiology and Imaging
Manipal Teaching Hospital
Pokhara, Nepal
Email: rctcat2000@yahoo.com



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oligohydramnios as a DVP of less than two centimeters or less will result in fewer obstetric interventions without a change in adverse outcomes as compared to defining oligohydramnios as an AFI of less than or equal to five centimeters.^{3,4} Oligohydramnios occurs in 0.5 to 1 % of all pregnancies.⁵ During pregnancy, fetal urine is major component of amniotic fluid. At term, a normal fetus can swallow and void more than 50 % of total amniotic fluid volume daily.⁶ Therefore, lack of production of fetal urine in renal agenesis, severe urinary dysplasia or urinary obstruction will result in oligohydramnios. The extrarenal anomalies like facial anomalies, pulmonary hypoplasia, abnormal positioning of hands and feet, breech presentation etc. are result of compression of the fetus.⁷ There may be growth retardation of the fetus. Sonographic examination of the fetus is compromised when oligohydramnios is present. However, ultrasonography still reveals important fetal anatomic landmarks and major anomalies can be detected if thorough and detailed scan is done whenever a pregnant lady with oligohydramnios comes for an ultrasound scan. The aim of this study was to estimate the association between oligohydramnios and congenital anomalies in pregnant women of western Nepal.

METHODS

This prospective study was done in the department of Radiodiagnosis and Imaging of Manipal Teaching Hospital between June 2016 to June 2018. All pregnancies irrespective of gestational age and parity with amniotic fluid volume deepest pocket less than 2 cm were included in our study. Ultrasonography was done using Acuson-X 300 SIEMENS and LOGIQ P3 GE machines. Patient position was supine. Since American college of Obstetrician and Gynecologists have supported the use of DVP of amniotic fluid volume of two centimeters or less to diagnose oligohydramnios rather than amniotic fluid index of five centimeters or less, we followed criteria for oligohydramnios to be DVP less

than 2cm for our study.^{1,2} Oligohydramnios was categorized as mild if depth of largest visible pocket was greater than or equal to 1 to less than or equal to two centimeters. Oligohydramnios was categorized as severe if depth of largest visible pocket was less than one centimeters. DVP was measured as the vertical measurement, in centimeters, of the single deepest pocket of amniotic fluid with a transverse diameter of one centimeters or more wide without any fetal parts or umbilical cord.⁸

Detailed anomaly scan was done from 18 to 20 weeks in booked cases and whenever possible. Those presenting in third trimester were also scanned in detail for any anomalies. All the pregnancies were followed up in maternity wards and neonatal intensive care units to correlate with external anomalies depicted by ultrasound. Follow up ultrasound scan of fetus was done post-delivery to look for intraabdominal anomalies depicted by obstetric ultrasound. Statistical analysis was done using SPSS (Version 16).

RESULTS

During the study period of two years there were 86 cases of oligohydramnios in our hospital, 26 had rupture of membrane and hence excluded from the study. Hence, a total of 60 cases were included for statistical analysis. Total deliveries during this period were 4,774. Prevalence of oligohydramnios was 1.2%. Most of the pregnant ladies were in the age group of 20 to 25 years. Mean age of pregnant women was 26 ± 6 years (Table 1). Pregnant ladies were more than 37 weeks during the time of scan in 40% cases (Table 2). Mild oligohydramnios were seen in 65% of pregnant ladies and 35% had severe oligohydramnios (Table 3). Renal followed by musculoskeletal anomalies were the commonest anomalies in our study. CNS, gastrointestinal anomalies were also detected by ultrasound scan (Table 4). Congenital anomalies were found in 10.25% of pregnant ladies with mild oligohydramnios and 33% of pregnant ladies with severe oligohydramnios (Table 5).

Table 1: Age distribution of pregnant women

Age Group	Frequency	Percentage
15-20 years	3	2
21-25 years	25	41.66
26-30 years	21	35
31-35 years	9	15
36-40 years	2	3.33
Total	60	100

Table 2: Distribution of Pregnant women according to gestational age

Gestational age	Frequency	Percentage
< 20 weeks	5	8.33
20 weeks 1 day to 33 weeks	20	33.33
33 weeks 1 day to 37 weeks	11	18.33
>37 weeks	24	40
Total	60	100

Table 3: Severity of oligohydramnios

Oligohydramnios	Fre-quency	Per-centage
Mild (Largest DVP greater than or equal to 1 to less than or equal to 2)	39	65
Severe (DVP less than 1 cm)	21	35

Table 4: Various congenital anomalies in oligohydramnios

Types of anomalies	Fre-quency	
Renal anomalies	5	Hydronephrosis/PUJ obstruction -3, Posterior urethral valve -1, Unilateral renal agenesis -1,
Musculo-skeletal	2	Skeletal dysplasias -2
Central nervous system	2	Meningocele -1, Corpus callosal agenesis -1
Cardiac	1	Ventricular Septal Defect -1
Gastroin-testinal	1	Gastroschisis-1

Table 5: Correlation of congenital anomalies with severity of oligohydramnios

Severity of Oligo-hydramnios	Congenital anomalies		Total
	Absent	Present	
Mild (DVP > or equal to 1 and less than or equal to 2 cm)	35	4	39
Severe (DVP <1cm)	14	7	21

DISCUSSION

This prospective study done over a period of two years included total number of 60 pregnant women with oligohydramnios. Prevalence of oligohydramnios was 1.2% which is less compared to results of 1.5% shown by Zhang J et al⁹ and 1.2% shown by Divon MY et al.¹⁰

Prevalence was 3.8% in study done by Philipson EH et al¹¹ whereas it was 3.1 % in study done by Chauhan SP et al.¹² In the present study, anomalies were present in 18.33% of the total cases. In study done by Bastide A et al¹³ incidence of anomalies was 13% which is similar. Incidence of congenital anomalies was 10% in study done by Casey BM et al⁵ and 4.2% in study done by Guin G et al¹⁴ incidence was lesser in study done by Shetty A et al¹⁵ which was only 5.8%.

Most common anomalies found in our study were renal malformations which is similar to study done by Shipp TD et al.¹⁶ Other common anomalies were musculoskeletal and gastrointestinal which is comparable to study done by Stroll C et al.¹⁷ Other anomalies included cardiac and CNS anomalies as was detected in studies done by Hill LM et al¹⁸ and Chamberlain PF et al.³

In our study, 11.42% of those with mild oligohydramnios had congenital anomalies whereas 33.33% of those with severe oligohydramnios had congenital anomalies. Similar results were found by Barss et al¹⁹ as 9 out of 12 cases of severe oligohydramnios

had anomalies. However, in study done by Chamberlain et al³ only 2.5% cases with mild oligohydramnios had congenital anomalies whereas only 9.3% cases with severe oligohydramnios had anomalies.

In our age study, 41.66% cases were in the age group of 20 to 25 years followed by 35% in age group of 26 to 30 years which is similar to study done by Nazlima et al²⁰ where 46.15 % were between 21 to 25 years. Vidyadhar et al²¹ also observed 78% women to be in age group of 20 to 29 years.

CONCLUSION

Oligohydramnios is associated with various congenital anomalies even in pregnancies that are not at risk and results in increased perinatal morbidity and mortality. Renal malformations followed by musculoskeletal malformations were commonest anomalies in our study. There is increased incidence of anomalies with increased severity of oligohydramnios. Hence, detailed ultrasound scan to look for any congenital malformations should be done whenever there is oligohydramnios so that timely intervention maybe done if deemed necessary.

CONFLICT OF INTEREST

None

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None

REFERENCES

1. Antepartum fetal surveillance. Practice Bulletin No. 145. American college of Obstetricians and Gynecologist. *Obstet Gynecol* 2014;124(1):182-192. <https://doi.org/10.1097/01.AOG.0000451759.90082.7b>
2. Reddy UM, Abuhamad AZ, Levine D, Saade GR, Participants FI. Fetal Imaging: Executive Summary of a Joint Eunice Kennedy Shriver National Institute of Child Health and Human Development, Society for Maternal-Fetal Medicine, American Institute of Ultrasound in Medicine, American college of Obstetricians and Gynecologist, American college of Radiology, Society for pediatric Radiology and Society of Radiologists in Ultrasound Fetal Imaging Workshop. *Obstet Gynecol* 2014;123(5):1070-1082. <https://doi.org/10.1097/AOG.0000000000000245>
3. Chamberlain PF, Manning FA, Morrison I, Harman CR, Lange IR. Ultrasound evaluation of amniotic fluid volume. The relationship of marginals and decreased amniotic fluid volumes to perinatal outcome. *Am J Obstet Gynecol* 1984;150(3):245-249. [https://doi.org/10.1016/S0002-9378\(84\)90359-4](https://doi.org/10.1016/S0002-9378(84)90359-4)
4. Divon MY. Longitudinal measurements of amniotic fluid index in post-term pregnancies and its association with fetal outcome. *Am J Obstet Gynecol* 1995;172(1):142-146. [https://doi.org/10.1016/0002-9378\(95\)90103-5](https://doi.org/10.1016/0002-9378(95)90103-5)
5. Casey BM, McIntire DD, Bloom SL et al. Pregnancy outcomes after antepartum diagnosis of oligohydramnios at or beyond 34 weeks gestation. *Am J Obstet Gynecol* 2000;182(4):909-912. [https://doi.org/10.1016/S0002-9378\(00\)70345-0](https://doi.org/10.1016/S0002-9378(00)70345-0)
6. Abramovich DR, Garden A, Jandial L, Page KR: Fetal swallowing and voiding in relation to hydramnios. *Obstet Gynecol* 1979;54(1):15-20. <https://doi.org/10.1097/00006250-197907000-00005>
7. Thomas IT, Smith DW. Oligohydramnios, cause of the nonrenal features of Potter's syndrome, including pulmonary hypoplasia. *J Pediatr* 1974;84(6):811-817. [https://doi.org/10.1016/S0022-3476\(74\)80753-5](https://doi.org/10.1016/S0022-3476(74)80753-5)
8. Chamberlain PF, Manning FA, Morrison I, Harman CR, Lange IR. Ultrasound evaluation of amniotic fluid volume. I. The relationship of marginal and decreased amniotic fluid volume to perinatal outcome. *Am J Obstet Gynecol* 1984;150(3):245-249. [https://doi.org/10.1016/S0002-9378\(84\)90359-4](https://doi.org/10.1016/S0002-9378(84)90359-4)

- [9378\(84\)90359-4](https://doi.org/10.1111/j.1471-0528.2004.00060.x)
9. Zhang J, Troendle J, Meikle S, Klebanoff MA, Rayburn WF. Isolated oligohydramnios is not associated with adverse perinatal outcomes. *BJOG: An International Journal of Obstetrics & Gynaecology* 2004;111(3):220-225. <https://doi.org/10.1111/j.1471-0528.2004.00060.x>
10. Divon MY, Marks AD, Henderson CE. Longitudinal measurement of amniotic fluid index in postterm pregnancies and its association with fetal outcome. *Am J Obstet Gynecol* 1995;172(1):142-146. [https://doi.org/10.1016/0002-9378\(95\)90103-5](https://doi.org/10.1016/0002-9378(95)90103-5)
11. Philipson EH, Sokol RJ, Williams T. Oligohydramnios: clinical associations and predictive value for intrauterine growth retardation. *Am J Obstet Gynecol* 1983;146(3):271-278. [https://doi.org/10.1016/0002-9378\(83\)90748-2](https://doi.org/10.1016/0002-9378(83)90748-2)
12. Chauhan SP, Sanderson M, Hendrix NW, Magann EF, Devoe LD. Perinatal outcome and amniotic fluid index in the antepartum and intrapartum periods: a meta-analysis. *Am J Obstet Gynecol* 1999;181(6):1473-1478. [https://doi.org/10.1016/S0002-9378\(99\)70393-5](https://doi.org/10.1016/S0002-9378(99)70393-5)
13. Bastide A, Manning F, Harman C, Lange I, Morrison I. Ultrasound evaluation of amniotic fluid: outcome of pregnancies with severe oligohydramnios. *Am J Obstet Gynecol* 1986;154(4):895-900. [https://doi.org/10.1016/0002-9378\(86\)90479-5](https://doi.org/10.1016/0002-9378(86)90479-5)
14. Guin G, Puneekar S, Lele A, Khare S. A Prospective Clinical Study of Feto-Maternal Outcome in Pregnancies with Abnormal Liquor Volume. *J Obstet Gynaecol India* 2011;61(6):652-655. <https://doi.org/10.1007/s13224-011-0116-6>
15. Shetty A, Shetty S, Rai SB. A study of congenital anomalies and perinatal outcome in oligohydramnios. *Int J Med Sci Public Health* 2013;2(4):1081-1083. <http://dx.doi.org/10.5455/ijm-sph.2013.040920132>
16. Shipp TD, Bromley B, Pauker S, Frigoletto FD Jr, Benacerraf BR. Outcome of singleton pregnancies with severe oligohydramnios in the second and third trimesters. *Ultrasound Obstet Gynecol* 1996;7(2):108-113. <https://doi.org/10.1046/j.1469-0705.1996.07020108.x>
17. Stoll C, Roth MP, Dott B, Bigel P. Étude des malformations congénitales dans le Nord de l'Alsace. *Méd Hyg* 1984;42(1552):505-512.
18. Hill LM, Breckle R, Wolfgram KR, O'Brien PC. Oligohydramnios: Ultrasonically detected incidence and subsequent fetal outcome. *Am J Obstet Gynecol* 1983;147:407-410. [https://doi.org/10.1016/S0002-9378\(16\)32235-9](https://doi.org/10.1016/S0002-9378(16)32235-9)
19. Barss VA, Benacerraf BR, Frigoletto FD: Second trimester oligo-hydramnios, a predictor of poor fetal outcome. *Obstet Gynecol* 1984;64(5):608-610. Available from: <https://europepmc.org/abstract/med/6387555> [Accessed 15th Jan 2019].
20. Nazlima N, Fatima B. Oligohydramnios at third trimester and perinatal outcome. *BJMS* 2012;11(1):33-36. <https://doi.org/10.3329/bjms.v11i1.9820>
21. Vidyadhar B. Bangal, Purushottam A. Giri, Bhushan M. Sali. Incidence of oligohydramnios during pregnancy and its effects on maternal and Perinatal outcome. *JPBMS*. 2011;12(05):1-4. Available from: <http://www.pubmed-house.com/journals/ms/articles/1082/PM-HID1082.pdf> [Accessed 25th Jan 2019].
22. Shipp TD, Bromley B, Pauker S, Frigoletto Jr FD, Benacerraf BR. Outcome of singleton pregnancies with severe oligohydramnios in the second and third trimesters. *Ultrasound in Obstetrics and Gynecology: Ultrasound Obstet Gynecol*. 1996;7(2):108-113. <https://doi.org/10.1046/j.1469-0705.1996.07020108.x>