Original Research Article

An evaluation of feto-maternal outcome in oligohydramnios: a prospective study

Isha Chaudhary*, Rita Mittal, Subhash Chauhan

Department of Obstetrics and Gynecology, Kamla Nehru Hospital, Indira Gandhi Medical College, Shimla, Himachal Pradesh, India

*Correspondence:
Dr. Isha Chaudhary,
E-mail: ishachaudhary161113@gmail.com

ABSTRACT

Background: Oligohydramnios is defined as amniotic fluid index (AFI) below 5th centile for the gestational age. AFI is an index of foetal well-being. It is associated with increased pregnancy complications, perinatal morbidity and mortality. AFI assessment would help to identify women who need increased antepartum and intra-partum surveillance. It occurs in 1-5% of pregnancies at term. We intended to do a specific study at our centre IGMC, Shimla to compare the maternal and perinatal outcome in pregnant women having isolated oligohydramnios at term with those having normal AFI.
Methods: This was a prospective observational case control comparative study conducted in the department of Obstetrics and Gynecology at Indira Gandhi Medical College, Shimla between 1st July 2019 to 30th June 2020. 50 cases with AFI≤5cm and 50 controls with AFI 8-20cm at 37-42 weeks were enrolled. Maternal and neonatal outcomes were compared.
Results: There was more foetal growth retardation (FGR) in study group 28% as compared to 10% in control group, more induction of labour in study group 50% as compared to control group 38%. 46% of patients from study group while only 20% patients from control group underwent LSCS. Significant difference observed between 1- and 5-minute APGAR scores in both groups. Low birth weight <2.5 kg was seen in 24% of neonates from study group and 10% of neonates from the control group. 50% of neonates from the study group were admitted in NICU for complications.
Conclusions: AFI is a valuable screening test for predicting foetal distress in labour requiring caesarean section. Timely intervention is required to reduce perinatal morbidity and mortality.

Keywords: AFI, Oligohydramnios

INTRODUCTION

Amniotic fluid is a clear, slightly yellowish liquid that surrounds the foetus during pregnancy, contained within amniotic sac and provides supportive environment for the foetus throughout the pregnancy for normal growth and development.[1] Its pressure helps in reducing the loss of lung fluid & assist in pulmonary development.[2] It supports development of musculoskeletal system by permitting foetal movements and also in development of gastrointestinal system by foetal swallowing of amniotic fluid.[2] Umbilical cord compromise is avoided due to adequate amniotic fluid thereby protecting the foetus from nutritional and vascular compromise.[2] Normal level of fluid indicates proper functioning of the developing foetus while low levels can be associated with incomplete lung development and poor foetal growth.[1] Hence amniotic fluid measurement may be an indirect evidence of foetal well-being. Amniotic fluid volume evaluation may be done using either of two semi quantitative techniques, the single deepest pocket of fluid (AFP) or the amniotic fluid index (AFI) which was described by Phelan and associates

(1987). The AFI is considered normal if it is greater than 5cm and below 25 cm.[3] Oligohydramnios is defined as an amniotic fluid index below 5th centile for the gestational age as per Moore and Cayle.[1,4] It occurs in about 1-5% of pregnancies at term.[1,5] Oligohydramnios is caused by pregnancy induced hypertension (PIH), congenital anomalies like renal agenesis, idiopathic, post-dated pregnancy and infections.[6]

Oligohydramnios particularly in third trimester has been associated with multiple foetal risks like cord compression, musculoskeletal abnormalities such as facial distortion and clubfoot, intrauterine growth restriction, low birth weight, foetal distress in labour, meconium aspiration syndrome, severe birth asphyxia, low APGAR scores, NICU admissions, congenital abnormalities and still births.[7] It has been observed that antepartum or intrapartum AFI <5 cm is associated with a significant increase in risk of caesarean section for foetal distress and low Apgar scores at 5 minute.[8] It increases maternal morbidity by increasing rates of induction and/or operative interference.[9] We did this study in our tertiary care hospital to compare the maternal and perinatal outcome in oligohydramnios with normal pregnancies.

METHODS

This was a prospective observational case control comparative study conducted in the department of Obstetrics and Gynaecology, Kamla Nehru State Hospital for Mother and Child, Indira Gandhi Medical College, Shimla from 1st July 2019 to 30th June 2020. Cases were selected from OPD as well as ward. 50 subjects with oligohydramnios (AFI≤5 cm) were enrolled as cases and 50 subjects with AFI 8-20 cm were enrolled in control group at period of gestation 37-42 weeks after satisfying inclusion and exclusion criteria.

Inclusion criteria

All singleton pregnancies, cephalic presentation, at term 37-42 weeks, intact membranes, AFI measurement within 7 days of delivery or at onset of labour, delivering at study institution.

Exclusion criteria

Gestational age<37 weeks and >42 weeks, multiple pregnancy, malpresentations, antepartum haemorrhage, High risk pregnancy hypertensive disorders of pregnancy. diabetes, chronic renal disease/cardiac disease and other medical ailment, connective tissue disorders.

Detailed clinical history was taken. After a detailed general physical examination and obstetric examination, various laboratory investigations (routine and specific) were done. Ultrasound was done for assessment of gestational age, estimated foetal birth weight and AFI. AFI was measured by Phelan's technique. These patients were monitored till the delivery and their labour details including

spontaneous/induced labour, duration of labour, any intrapartum complications, such as non-reassuring foetal heart sounds (NRFHS), meconium-stained liquor (MSL), non-progress of labour, mode of delivery (vaginal, operative vaginal, LSCS) and neonatal details including birth weight, APGAR scores, congenital malformations and NICU admissions, were taken into account. If patient did not deliver within 1 week, repeat ultrasound was done and the latest USG was then taken into consideration.

Mother and baby were followed till their discharge from the hospital. The data was analysed using appropriate statistical tests techniques. The Chi-square test was used to compare the categorical variables. The p-value<0.05 was considered significant.

RESULTS

The mean age of study group was 26.44 and for control group was 28. The urban and rural demographic distribution between the groups was statistically non-significant (Table 1).

There was no significant difference in the gravidity distribution in study and control groups, with oligohydramnios was seen slightly more in primigravida (Table 2). The Labour was induced in 25 (50%) women with AFI≤5 cm and 19 (38%) women with AFI between 8-20 cm, though induction of labour was more in the study group but the difference between two groups in this category was statistically not significant (Chi square=2.224 p value=0.329) (Table 3).

The Patients in study and control group were monitored till the delivery and intrapartum complications such as non-reassuring foetal heart sound (NRFHS), MSL, non-progress of labour were noted. 12 (24%) patients in study group developed foetal distress in form of NRFHS while only 6(12%) patients developed NRFHS in control group, this was statistically insignificant (p value-0.057). MSL was seen in 19 (38%) patients of the study group while 7 (14%) patients had MSL in control group, this was statistically significant (p value 0.019). 2 (4%) patients in control group had NPOL. 19 (38%) patients from study group and 35 (70 %) patients from the control group had uneventful intra-partum period. Overall intra-partum complications were more in oligohydramnios group, which was statistically significant (Chi square=14.279 p=0.003significant) (Table 4).

Operative vaginal delivery was observed in 8 (16%) in study group as compared to 5 (10%) in control group. LSCS was done in 23 (46%) patients from study group as compared to 10 (20%) in control group (statistically significant p value-0.008). More number of subjects in control group had normal vaginal delivery 35 (70%) as compared to 19 (38%) in study group (Chi square=9.652 p=0.008 significant) (Table 5). 23 (46%) patients from the study group and only 5 (10%) patients from the control group had APGAR<7 at 1 minute. 27 (54%) from the study

group and 45 (90%) of patients from the control group had APGAR>7 at 1 minute (p value-0.000 significant). In the study group 8 (16%) patients had APGAR<7 at 5 minutes while no patient in control group had APGAR<7 at 5 minutes (p value 0.001 significant) (Table 6).

A total 12 (24%) newborns from the study group while only 5 (10%) newborns from the control group had birth weight<2.5 kgs. There was more association of low birth weight with oligohydramnios group, attributed to associated IUGR (statistically significant p value 0.04) (Table 7). Only 1 (2%) patient from the study group had minor congenital malformations in the form of congenital talipes equinovarus (CTEV) while no congenital

malformation was seen in control group (Chi square=1.010 p value=0.315 not significant) (Table 8). 25 (50%) Babies from the study groups while 7 (14%) babies from the control group were admitted in NICU for various neonatal complications. (Chi square=14.89 p value-0.000 statistically significant) (Table 9). 3 (6%) Babies from the study group suffered neonatal deaths in NICU for neonatal complications. 2 neonates died due to Meconium aspiration syndrome with early onset sepsis and one died due to severe respiratory distress syndrome with IUGR. While no baby from the control group suffered neonatal death. (Chi square=3.093 p value 0.079 statistically not significant) (Table 10).

Table 1: Demographic distribution.

Demographic distribution	Study group (n=50)		Control group (n=50)	
	Frequency	%	Frequency	%
Urban	30	60	25	50
Rural	20	40	25	50

Chi square=2.554, p value=0.110 not significant.

Table 2: Gravidity distribution.

Gravidity	Study group (n=50)		Control group (n=50)	
	Frequency	%	Frequency	%
Primigravida	28	56	24	48
Multigravida	22	44	26	52

Chi square=0.641, p value=0.423 not significant.

Table 3: Onset of labour.

Onset of labour	Study group (n=50)		Control group (n=50)	
	Frequency	%	Frequency	%
Induced	25	50	19	38
Spontaneous	25	50	31	62

Chi square=2.224, p value=0.329, not significant.

Table 4: Intrapartum complications.

Intrapartum complications	Study group (n=50)		Control group (n=50)	
	Frequency	%	Frequency	%
None	19	38s	35	70
NRHR	12	24	6	12
MSL	19	38	7	14
NPOL	0	0	2	4

Chi square=14.279, p value=0.003, s=significant.

Table 5: Mode of delivery.

Mode of delivery	Study group (n=50)		Control group (n=50)	
	Frequency	%	Frequency	%
Vaginal delivery	19	38	35	70
Operative vaginal	8	16	5	10
LSCS	23	46	10	20

Chi square=9.652, p value=0.008 significant.

Table 6: APGAR.

APGAR<7	Study group (50)		Control group (50)	
	Frequency	%	Frequency	%
At 1 minute	23	46	5	10
At 5 minutes	8	16	0	0

APGAR at 1 minute p value=0.000, APGAR at 5-minute p value=0.001 significant.

Table 7: Birth weight<2.5kgs.

Birth weight (kgs)	Study group (50)		Control group (50)	
	Frequency	%	Frequency	%
<2.5	12	24	5	10
>2.5	38	76	45	90

p value=0.04 significant.

Table 8: Congenital malformations.

Congenital malformation	Study group (50)		Control group (50)	
	Frequency	%	Frequency	%
Present	1	2	0	0
Absent	49	98	50	100

Chi square=1.010, p value=0.315 not significant.

Table 9: NICU admissions.

NICU admissions	Study group (50)		Control group (50)	
	Frequency	%	Frequency	%
Absent	25	50	43	86
Present	25	50	7	14

Chi square=14.890, p value=0.000 significant.

Table 10: Neonatal deaths.

Neonatal deaths	Study group (50)		Control group (50)	
	Frequency	%	Frequency	%
Absent	47	94	50	100
Present	3	6	0	0

Chi square=3.093, p value=0.079 not significant.

DISCUSSION

In the present study outcome of 50 patients with oligohydramnios (AFI≤5 cm) was compared with 50 patients without oligohydramnios (AFI 8-20 cm).

Rate of induction

In our study, we observed that 50% of subjects in study group were induced as compared to 38% in control group, suggesting a greater number of inductions of labour in oligohydramnios. This is similar to results of studies conducted by Kaur et al and by Kahkaie et al, where rate of induction was 54% and 24%, 42% and 38% in study and control groups respectively.[8,10] In studies conducted by Patil et al and Sreelakshmi et al, the rate of induction was low in both study and control groups as compared to our study because the subjects were only induced at term if they failed to undergo spontaneous labour.[5,6] Also study conducted by Verma et al showed even higher rate of induction in study group (62%) because of strict foetal monitoring by NST.[11] (p value<0.005, which was significant).

Intra-partum complications

In our study, complications like NRFHR and MSL were seen more in the study group 24% and 38% respectively which was significantly more as compared to control group. This is comparable to study conducted by Sreelakshmi et al, where 32% and 31% of patients from study group had NRFHR and MSL.[6]

Whereas MSL was seen in 60% of patients from the study group in the study conducted by Kaur et al, which was very high incidence, this was due to the fact that they included high risk cases like preeclampsia with or without severe features which per say is a risk factor for MSL.[10]

Mode of delivery

In our study, there was more normal vaginal delivery in control group while incidence of operative delivery is more in study group. 46% of subjects underwent LSCS from the study group while 20% of subjects had LSCS from the control group. Also as compared to control group (10%) there were a greater number of operative vaginal deliveries in study group (16%). These results are comparable with studies conducted by Rathod et al, where 32% and 26%, Kaur et al, where 48% and 22% and Sreelakshmi et al, where 59% and 9 %, underwent LSCS from study and control groups respectively.[1,6,10] This data suggests there was significant increase in operative interference in patients with oligohydramnios when compared to those with normal AFI.

APGAR Score

In our study, APGAR score<7 was seen in 46% of patients at 1 minute and in 16% of patients at 5 minutes with oligohydramnios, while only 10% of patients had APGAR<7 at 1 minute and 0 patients had APGAR<7 at 5 minute from the control group. The results were comparable with other studies such as, Sreelakshmi et al, where 21% from study and 9% from control group had APGAR<7 at 5 minutes.[6] It is clearly evident from present as well as previous studies that babies delivered to mothers with oligohydramnios have low APGAR score at 1 minute and 5 minute.

Birth weight

Birth weights were significantly less in new-borns with oligohydramnios. The mean birth weight was 2.7 kgs in study group and 2.9 kgs in control group. The occurrence of LBW babies in oligohydramnios was 24% which is comparable with other studies like Chaudhary et al, where 35% from study group and 13% from control group and Verma et al where 36% from the study group and 14% from control group had birth weight <2.5 kgs. This was attributed to higher incidence of IUGR with oligohydramnios.[4,11]

NICU admissions

50% of New-borns from the oligohydramnios group were admitted in NICU for various complications like neonatal seizures, birth asphyxia, meconium aspiration etc, as compared to 14% from the control group. This result is consistent with other studies like Kaur et al, where NICU admission was seen in 40% in study group and 12% in the study group.[10] Also in study done by Padmini CP et al, 44% of new-borns from the study group and 14% new-borns from control group were admitted in NICU.[12]

Neonatal death

In our study, there were 3 (6%) neonatal deaths in the study group and no neonatal deaths in control group, this data was statistically non-significant (p=0.079). Two neonates died due to Meconium aspiration syndrome with early onset sepsis and one died due to severe respiratory distress syndrome with IUGR. This result is comparable with study done by Kaur et al, where neonatal deaths were 8%.[10]

Congenital malformation

Only 1 (2%) congenital malformation was seen in study group, which was congenital talipes equinovarus (CTEV). There were no anomalies observed in new-borns from the control group. In the study conducted by Ahmar R et al, most congenital malformations found were of urinary tract system and few cases of CTEV.[7]

Age and parity were not matched in study and control group. Confounding factors affecting the progress of labour and fetomaternal outcomes were not considered. Sample size was small.

CONCLUSION

An AFI of≤5 cm detected after 37 completed weeks of gestation is an indicator of poor perinatal outcome. In the presence of oligohydramnios, there is more occurrence of intrauterine growth restriction, induction of labour, intrapartum complications such as meconium staining of liquor, non-reassuring foetal heart rate, lower APGAR scores at 1 and 5 minutes, lower birth weights and higher incidence of NICU admissions.

High risk pregnancies including hypertensive disorders of pregnancy, diabetes, chronic renal maternal diseases were excluded from the study indicating oligohydramnios alone is enough to cause chronic hypoxic situation leading to above mentioned complications. Determination of AFI can be used as an adjunct to other foetal surveillance methods and helps to identify those infants at risk of poor perinatal outcome. Also determination of AFI is a valuable screening test for predicting foetal distress in labour requiring caesarean section. Timely intervention is required to reduce perinatal morbidity and mortality. Hence, oligohydramnios diagnosed during antepartum period warrants close foetal surveillance.

REFERENCES

1. Rathod S, Samal SK. Evalution of maternal and perinatal outcomes of induction in borderline oligohydramnios at term. J Clin and Diagnost Research 2017;11(9):5-7.
2. Puri M, Sharma K. Low amniotic fluid index and intranatal and perinatal outcome in term pregnancy. Int J Med Heal Res. 2017;3(11):129-34.

3. Cunningham FG, Leveno KJ, Bloom SL, Dashe JS, Hoffmann BL, Casey BM, et al. Amnionic fluid. In:Williams Obstetrics,25th Edn. New York, NY: McGraw- Hill;2018:227.

4. Chaudhary R, Dhama V, Singh S, Singh M. Correlation of reduced amniotic fluid index with neonatal outcome. Int J Reprod Contracept Obsetet Gynecol 2017;6(6):2401-6.

5. Patil SV, Shaikmohammed FZ. Study of Oligohydramnios and its perinatal outcome. Int J Reprod Contracept Obstet Gynecol 2019;8:2705-8.

6. Sreelakshmi U, Bindu T, Subhashini T. Impact of oligohydramnios on maternal and perinatal outcome: a comparative study. Int J Reprod Contracept Obstet Gynecol.2018;7:3205-10.

7. Ahmar R, Prawn S, Kumari S, Kumar M. Neonatal and maternal outcome in oligohydramnios: a prospective study. Int J Contemp Pediatr 2018;5(4):1409-13.

8. Kahkhaie K, Keikha F, Keikhaie R, Abdollahi Mohammad A, Salehin S. Perinatal outcome after diagnosis of oligohydramnios at term. Iran Red Crescent Med J. 2014;16(5):11772.

9. Bhat S, Kulkarni V. Study of effect of oligohydramnios on maternal and foetal outcome. Int J Med and Dent Sci. 2015;4(1):582-8.

10. Kaur P, Desai DA, Taraiya A. A study on the perinatal outcome in cases of oligohydramnios. Int J Reprod Contracept Obstet Gynecol. 2016;5:98-109.

11. Verma M, Gupta S, Ahuja MV, Pratap P. Relationship of decreased amniotic fluid and perinatal outcome: a comparative study. Int J Res Med Sci.2016;4(9):4093-4096.

12. Padmini CP, Chaitra R, Indra N, Sriram AM. A prospective study of effect of amniotic fluid index less than 5 at term on perinatal outcome. Int J Reprod Contracept Obstet Gynecol. 2016;5:1732-5.

Cite this article as: Chaudhary I, Mittal R, Chauhan S. An evaluation of feto-maternal outcome in oligohydramnios: a prospective study. Int J Reprod Contracept Obstet Gynecol 2025;14:1789-94.