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Original Article

Obstetrics and Gynaecology Section

Evaluation of Maternal and Perinatal Outcomes of Induction in Borderline Oligohydramnios at Term

SETU RATHOD[1], SUNIL KUMAR SAMAL[2]

ABSTRACT

Introduction: Oligohydramnios is described as decreased amniotic fluid volume relative to gestational age. Semiquantitatively it is described using the Amniotic Fluid Index (AFI) which is calculated by adding the depth in centimetres of the largest vertical pocket in each of four equal uterine quadrants. AFI less than or equal to 5 cm is defined as oligohydramnios. A Borderline Oligohydramnios (BO) is defined as AFI 5.1-8 cm.

Aim: To assess the maternal and perinatal outcome of induction in borderline oligohydramnios cases at term.

Materials and Methods: This is a retrospective observational study done from December 2015 to November 2016 in Mahatma Gandhi Medical College and Research Institute, Puducherry, India. Fifty cases of BO with AFI 5.1 cm - 8 cm taken as case and another 50 cases of Normal Liquor (NL) with AFI 8.1 cm - 18 cm taken as control. Data was collected and analysed by SPSS software version 20.0 For qualitative data, the χ^2-test or Fisher's-exact test were used and for continuous variables, the t-test was used.

Results: Cases and controls were matched in baseline parameters. More number of cases were found with meconium stained liquor during labour which is statistically significant ($p<0.05$). Otherwise there were no statistical significant difference between cases and controls in maternal and perinatal outcome.

Conclusion: Induction of labour in cases with BO cases compared to those with NL at term did not show very statistically significant difference in terms of induction to delivery interval and neonatal outcome.

Keywords: Amniotic fluid index, Fetal outcome, 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. Amniotic fluid throughout gestation enables normal development of the foetal respiratory, gastrointestinal and urinary tracts and musculoskeletal system and allows for continued foetal growth in a non-restricted sterile and thermally controlled environment. It protects the foetus from trauma and infection through its dampening and bacteriostatic properties. It prevents compression of the umbilical cord and placenta and protects the foetus from vascular and nutritional compromise [1].

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 [1,2]. AFI has been known to play significant role in obstetric management [3]. Oligohydramnios is described as decreased amniotic fluid volume relative to gestational age. Semiquantitatively it is described using the AFI which is calculated by adding the depth in centimetres of the largest vertical pocket in each of four equal uterine quadrants [1,4]. AFI less than or equal to 5 cm is defined as oligohydramnios [1-3,5-7]. A borderline AFI has been defined as an AFI of 5.1 cm to 8 cm [3,5,6,8]. The incidence of an AFI of 5.1 to 8 cm compared with a normal AFI (8.1 cm to 18 cm) in different studies varied from 6% to 44%, with the overall rate being 12% [8].

The impact of oligohydramnios on maternal and foetal outcome can be significant. It can cause foetal complication like cord compression, foetal pulmonary hypoplasia, foetal growth restriction, low APGAR score, Neonatal Intensive Care Unit (NICU) admission and foetal mortality. Maternal complications like prolonged labour due to inertia and increased incidence of operative intervention can occur [1,9,10].

A review of the scientific literature concerning changes in amniotic fluid volumes supports the intimate association of amniotic fluid volumes with foetal wellbeing in conjuction with other determined risk factors, leading many practitioners to become very aggressive when dealing with decreased levels of fluid, even in healthy term pregnancies [2,3,7,11,12]. What is not well demonstrated is the effect on foetal well being of abnormal amniotic fluid levels at term in the absence of other risk factors. Numerous studies have been conducted to assess perinatal outcomes in borderline AFI and oligohydramnios and the results have been conflicting [5,6,13-15]. Hence, the purpose of this study is to assess the maternal and perinatal outcome of induction in BO cases at term.

MATERIALS AND METHODS

The study was a retrospective observational study done in Mahatma Gandhi Medical College and Research Institute, Puducherry, India, from December 2015 to November 2016. Institutional Ethical Committee clearance was taken before commencement of the study.

Data was collected from the records in Labour ward and medical record section. The sample size calculation was obtained from a pilot study based on the outcome [5]. With a power of 80% at the 95% probability level, it was found that at least 49 participants required for each group. Therefore 50 cases of BO with AFI 5.1 cm - 8 cm taken as cases and 50 cases of normal liquor (AFI=8.1 cm -18 cm) taken as controls. Inclusion criteria were singleton, vertex presentation with unscarred uterus. Exclusion criteria were previous scarred uterus, multiple pregnancy, malpresentation, placenta praevia and pregnancy with any congenital anomaly. Cases were matched with controls in baseline parameters like age, parity, gestational age and Bishop's score [16] at the time of induction.

STATISTICAL ANALYSIS

Data were collected and analysed by SPSS software version 20.0 For qualitative data, the χ^2-test or Fisher's-exact test were used as appropriate to test the statistical significance. For continuous variables, the t-test was used. The p<0.05 was considered statistically significant.

RESULTS

Both groups (BO versus NL) were comparable in relation to age, parity, gestational age and preinduction cervical Bishop's score [Table/Fig-1]. The mean induction to delivery interval was higher in the BO cases as compared to NL cases (21.7 hours vs 20.8 hours) but it is not statistically significant (p-value>0.05). Caesarean section and instrumental delivery rates (32% and 16% respectively) were more in the BO group than that in the NL group (26% and 10% respectively), it was also not statistically significant (p-value>0.05). More number of BO cases had meconium stained liquor in labour compared to NL case which was statistically significant (p=0.048)

Parameters	AFI(5.1 -8)	AFI(8.1-18)	p-value
Age (in years)			
20-25	24(48%)	27(54%)	0.555*
26-30	20(40%)	15(30%)	
>30	6(12%)	8(16%)	
Mean age	24.980± 4.536	25.210± 4.768	
Gravida			
Primigravida	20(40%)	25(50%)	0.163#
G2	24(48%)	15(30%)	
G3	6(12%)	10(20%)	
Gestational age (in weeks)			
38	20(40%)	18(36%)	0.473#
39	13(26%)	15(30%)	
40	10(20%)	12(24%)	
41	7(14%)	5(10%)	
Bishop's score [16]			
3	28(56%)	28(56%)	0.623#
4	5(10%)	0	
5	17(34%)	22(44%)	
Mean Bishop's score	3.78± 0.786	3.8± 0.874	

[Table/Fig-1]: Baseline parameters.
AFI- Amniotic fluid index. *Fisher's-exact test and # t-test were used

Intrapartum Observations	AFI (5.1 -8 cm)	AFI (8.1 -18 cm)	p-value
Fetal Heart Rate (FHR) tracing			
Normal	27 (54%)	35 (70%)	0.074$
Abnormal (<110/bpm or >160/bpm)	23 (46%)	15 (30%)	
Meconium stained liquor			
Present	24 (48%)	15 (30%)	0.048$
Absent	26 (52%)	34 (68%)	
Induction to delivery interval in hour			
17-19	10	22	0.121*
20-22	21	22	
>23	19	6	
Mean	21.7	20.8	
Mode of delivery			
Vaginal delivery	26	32	0.444*
Instrumental	8	5	
Lower Segment Caesarean Section (LSCS)	16	13	

[Table/Fig-2]: Intrapartum Observation.
$ Chi-square test and * Fisher's-exact test were used.

Perinatal outcome	AFI(5.1 -8 cm)	AFI(8.1 -18 cm)	p-value
APGAR Score<7			
One minute	11 (22%)	9 (18%)	0.234
Five minutes	6 (12%)	4 (8%)	0.834
NICU admission			
Admitted	12 (24%)	10 (20%)	0.810
Mother side	38 (76%)	40 (80%)	
Birth weight			
<2.5 kg	7 (14%)	5 (10%)	0.481
>2.5 kg	43 (86%)	45 (90%)	

[Table/Fig-3]: Perinatal outcome.
Chi-square test was used.

[Table/Fig-2]. There was no statistical significant difference between both the groups in terms of APGAR score < 7 at one minute and five minutes (p-value 0.234 and 0.834 respectively), birth weight (p-value 0.481) and NICU admission rate (p-value 0.810) [Table/Fig-3].

DISCUSSION

Although much work has been done in the field of induction of labour in cases of oligohydramnios (AFI <5 cm), but in case of induction in BO not much work has been reported. In this respect, our study can add more information in this field. Kwon J-Y et al., reported that incidence of BO varies from 6%-44% with an average of 12% [8]. According to Gumus II et al., and Banks EH and Miller DA the incidence of BO varies from 25%-35% with an average of 28% [14,15].

Venturini P et al., reported that incidence of Lower Segment Caesarean Section (LSCS) in the low AFI group (38.3%) was not significantly higher than in the control group (34.2%) [16]. Martinez Medel J et al., also found in their study that there was no significant difference between mode of delivery and caesarean section indication [17]. Alchalabi HA et al., reported that women in the low AFI group had increased rate of LSCS [18]. Manzanares S et al., found that women in the low AFI group when induced found to have increased incidence of LSCS and instrumental delivery [19]. During labour, non-reassuring Foetal Heart Rate (FHR) pattern was higher in BO group as compared to NL group (46% vs30%), which is statistically insignificant. According to Manzanares S et al., irregular FHR tracing is found to be significantly higher in the oligohydramnios group when induced [19]. Meconium stained amniotic fluid was found in more number of case of BO group during intrapartum as compared to NL group (48% vs 30%) which is statistically significant (p-value <0.05). Martinez Medel J et al., reported that, there is no significant difference in the meconium stained liquor in between low AFI and NL group [17].

There is no statistical significant difference between both the groups in terms of APGAR score of the babies at one minute and five minutes (p-value 0.234 and 0.834 respectively) and NICU admission rate (p-value 0.810). In literature, different authors reported that there was slight increase in the incidence of low APGAR score in new-borns of mothers with borderline liquor cases in comparison to NL group but it was statistically insignificant [5-8, 12,14,17]. But there was no significant difference in NICU admission in case of induction in low liquor group when compared with those having NL [5,10,13]. Venturini P et al., reported that there is no significant difference in the perinatal outcome of induction in nulliparous women with unfavourable cervix with oligohydramnios compared with those having NL [16].

LIMITATION

Small sample size and being a retrospective observational study and further research with a larger sample size is needed in this field.

CONCLUSION

Based on all the observations, analysis and inferences, it has been observed that induction of labour in cases with BO cases compared to those with NL at term did not show very statistically significant difference in terms of induction to delivery interval and neonatal outcome. This implies that borderline liquor does not influence the mechanism of labour. Although a relatively high LSCS rate was seen in those with borderline liquor, but it was not statistically significant. It can be summed up that borderline liquor volume does not offer any impediment as such to induction of labour and compares favourably to induction of labour with NL.

REFERENCES

[1] Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, et al. Amniotic fluid. In: Williams Obstetrics. New York: McGraw Hill Education; 2014. page 460–76.

[2] Shanks A, Tuuli M, Schaecher C, Odibo AO, Rampersad R. Assessing the optimal definition of oligohydramnios associated with adverse neonatal outcomes. J Ultrasound Med Off. 2011;30(3):303–07.

[3] Souza ASR, de Andrade LR, da Silva FLT, Cavalcanti AN, Guerra GV de QL. Maternal and perinatal outcomes in women with decreased amniotic fluid. Rev Bras Ginecol Obstet. 2013;35(8):342–48.

[4] Phelan JP, Smith CV, Broussard P, Small M. Amniotic fluid volume assessment with the four-quadrant technique at 36-42 weeks' gestation. J Reprod Med. 1987;32(7):540–42.

[5] Choi SR. Borderline amniotic fluid index and perinatal outcomes in the uncomplicated term pregnancy. J Matern Fetal Neonatal Med. 2016;29(3):457–60.

[6] Petrozella LN, Dashe JS, McIntire DD, Leveno KJ. Clinical significance of borderline amniotic fluid index and oligohydramnios in preterm pregnancy. Obstet Gynecol. 2011;117:338–42.

[7] Sultana S, Akbar Khan MN, Khanum Akhtar KA, Aslam M. Low amniotic fluid index in high-risk pregnancy and poor apgar score at birth. J Coll Physicians Surg-Pak. 2008;18(10):630–34.

[8] Kwon J-Y, Kwon H-S, Kim Y-H, Park Y-W. Abnormal Doppler velocimetry is related to adverse perinatal outcome for borderline amniotic fluid index during third trimester. J Obstet Gynaecol Res. 2006;32(6):545–49.

[9] Hashimoto K, Kasdaglis T, Jain S, Atkins K, Harman CR, Baschat AA, et al. Isolated low-normal amniotic fluid volume in the early third trimester: association with adverse perinatal outcomes. J Perinat Med. 2013;41(4):349–53.

[10] Magann EF, Chauhan SP, Hitt WC, Dubil EA, Morrison JC. Borderline or marginal amniotic fluid index and peripartum outcomes: a review of the literature. J Ultrasound Med. 2011;30(4):523–28.

[11] Johnson JM, Chauhan SP, Ennen CS, Niederhauser A, Magann EF. A comparison of 3 criteria of oligohydramnios in identifying peripartum complications: a secondary analysis. Am J Obstet Gynecol. 2007;197(2):207.e1-e7.

[12] Ulker K, Ozdemir IA. The relation of intrapartum amniotic fluid index to perinatal outcomes. Kafkas J Med Sci. 2011;1(1):01–07.

[13] Wood SL, Newton JM, Wang L, Lesser K. Borderline amniotic fluid index and its relation to fetal intolerance of labor: a 2-center retrospective cohort study. J Ultrasound Med. 2014;33(4):705–11.

[14] Gumus II, Koktener A, Turhan NO. Perinatal outcomes of pregnancies with borderline amniotic fluid index. Arch Gynecol Obstet. 2007;276(1):17–19.

[15] Banks EH, Miller DA. Perinatal risks associated with borderline amniotic fluid index. Am J Obstet Gynecol. 1999;180:1461–63.

[16] Venturini P, Contu G, Mazza V, Facchinetti F. Induction of labor in women with oligohydramnios. J Matern Fetal Neonatal Med. 2005;17(2):129–32.

[17] Martínez Medel J, Campillos Maza JM, Lapresta Moros C, Villacampa Pueyo A, Tobajas Homs J. Cervical preinduction and oligoamnios. Ginecol Obstet Mex 2008;76(9):499–506.

[18] Alchalabi HA, Obeidat BR, Jallad MF, Khader YS. Induction of labor and perinatal outcome: the impact of the amniotic fluid index. Eur J Obstet Gynecol Reprod Biol. 2006;129(2):124–27.

[19] Manzanares S, Carrillo MP, González-Perán E, Puertas A, Montoya F. Isolated oligohydramnios in term pregnancy as an indication for induction of labor. J Matern Fetal Neonatal Med. 2007;20(3):221–24.

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Obstetrics and Gynaecology, Mahatma Gandhi Medical College and Research Institute, Puducherry, India.
2. Assistant Professor, Department of Obstetrics and Gynaecology, Mahatma Gandhi Medical College and Research Institute, Puducherry, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Sunil Kumar Samal,
Type-II, 4D, Staff Quarters Mahatma Gandhi Medical College and Research Institute,
Pillaiyarkuppam-607402, Puducherry, India.
E-mail: drsksamal1981@gmail.com

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