Original Research Paper

Volume-8 | Issue-2 | February-2018 | PRINT ISSN No 2249-555X

Gynecology

ASSOCIATION OF AMNIOTIC FLUID INDEX WITH NEONATAL OUTCOMES AT A TERTIARY LEVEL HOSPITAL IN PUNE, INDIA

Dr.Avnika Kapoor* Resident 3rd year MD Department of Obstetrics and Gynecology Bharati Vidyapeeth Medical College, Pune *Corresponding Author

Dr.Vaishali Taralekar MD, Professor, Head Of Unit Department of Obstetrics and Gynecology Bharati Vidyapeeth Medical College, Pune

Dr Savita Mehendale MD, Professor Department of Obstetrics and Gynecology Bharati Vidyapeeth Medical College, Pune

ABSTRACT

Introduction: Amniotic fluid plays a vital role in the normal growth of the fetus. This study was done to evaluate amniotic fluid index (AFI) in low risk pregnancies between 36 and 40 weeks of gestation and to correlate AFI with neonatal outcome at birth.

Methodology: A cross-sectional study of all registered low risk women with expected delivery between 36 to 40 weeks in the Department of Obstetrics and Gynaecology, Bharati Hospital from August 2015 to August 2017 was done. Two groups of patients were made: AFI less than 7 cm included patients who were treated but remained oligohydramnic and those with 7 cm or higher included treated cases of oligohydramnios. Neonatal outcomes were noted and comparisons were made between neonatal outcomes before and after treatment for high or low AFI.

Results: Mean age of the patients and AFI was was 24.9 ± 4.07 years and 10.55 ± 4.71 repectively. the mode of delivery and meconium staining was not significantly different between low or high AFI groups. Admission to NICU was significantly higher in babies born to mothers with AFI less than 7 ($p<0.01$). Similarly mean birth weight of babies was found to be significantly lower in group of mothers with AFI less than 7. AGPGAR at 1 and 5 minutes was not significantly different between the two groups.

Conclusions: Our results show that low AFI and more specifically persistence of low AFI can be used as an adjunct to other fetal surveillance methods to help in identification of infants at risk of poor perinatal outcome.

KEYWORDS : amniotic fluid, outcome, oligohydramnios, pregnancy

INTRODUCTION

Amniotic fluid plays a vital role in the normal growth of the fetus as it provides a protective environment for fetal development during pregnancy. A decreased amniotic fluid volume (oligohydramnios) can occur because of numerous reasons. Ultrasonography is non-invasive and is used widely for the follow up of pregnancy. Using the results of ultrasound, amniotic fluid index (AFI) and single deepest pocket are calculated to detect oligohydraminos, which in turn help us in predicting deceleration, risk for caesarean delivery for foetal distress and low APGAR score. Chronic oligohydraminos can result in foetal demise, pulmonary hypoplasia, facial and skeletal deformities. Similarly, decreased liquor volume in labour may decrease intervillous space volume, which may predispose to umbilical cord occlusion, both of which increases the risk of foetal hypoxaemia and will negatively influence the Apgar score of baby at birth. Moreover, in high risk pregnancies, decline of AFI can be at a faster rate. It has been observed that antepartum or intrapartum AFI less than 5 cm is associated with significant rise of risk to LSCS for foetal distress and low APGAR at 5 minutes.

Despite numerous studies, very few have focussed on the neonatal outcome in cases with low AFI who were treated successfully during the course of pregnancy, especially low risk pregnancies. This study was done to evaluate AFI in low risk pregnancies between 36 and 40 weeks of gestation and to correlate AFI with neonatal outcome at birth.

METHODOLOGY

Study Design and sampling

A cross-sectional study of all registered low risk women with expected delivery between 36 to 40 weeks in the Department of Obstetrics and Gynaecology, Bharati Hospital having a tertiary care facilities at Bharati Vidyapeeth University Medical College, Pune from August 2015 to August 2017 was performed. In this study all registered, low risk pregnant women between 36 to 40 weeks of gestation were included. This included patients which were treated for oligohydramnios before 36weeks but remained oligohydramnic and those patients which were treated for oligohydramnios before 36 weeks with amniotic fluid index more than 7. Unregistered pregnant women and those not willing to deliver in Bharati Hospital were excluded. Pregnant women with medical disorders like hypertension, severe anaemia, pregnancy induced hypertension etc and those with frank leak were excluded as well. In this study, the neonatal outcome at birth in cases with AFI less than 7 cm and those with 7 cm or higher in terms of birth weight, APGAR score and neonatal intensive care unit admissions of baby was compared. Further, neonatal outcome at birth in cases with oligohydramnios diagnosed before 36 weeks and treated for that but remained oligohydramnic was studied. Based on data from previous years, a sample size of 100 was decided. All patients included in the study were explained the purpose of the study and informed written consent was taken from them.

Data Collection and Data Analysis

After obtaining approval of the institutional ethics committee, the patients using a pretested semi-structured questionnaire were interviewed. The socio-demographic information of the patients was collected. Detailed antenatal history including gestation age was noted for all patients. Thorough physical examination was performed and all essential investigation were done to rule out chronic diseases. After excluding the cases as per exclusion criteria informed written consent to be taken from pregnant women willing to take part in the study. All patients underwent ultrasound examination to estimate the gestational age and measure the amniotic fluid index. Two groups of patients were identified based on AFI. Those with AFI less than 7 cm included patients who were treated but remained oligohydramnic and those with 7 cm or higher included treated cases of oligohydramnios. Neonatal outcome was studied in terms of meconium or clear stained liquor, APGAR score, birth weight, admission in neonatal intensive care unit, baby with mother and neonatal death.

The data were entered and analysed in SPSS version 20. Quantitative data variable were expressed by using mean and standard deviation and qualitative data variables were described by frequency and percentage. Means in quantitative variables in patients with AFI less than 7 cm and those with 7 cm or higher were compared using student's t test and chi-square test/Fischer's exact test was used to find the association between qualitative variables. Such comparisons were made in all the patients (n=100) and also in those who received treatment for oligohydramnios (n=16). P value less than 0.05 considered as significant.

RESULTS

Mean age of the study cases was 24.9 years with most of the females in between 21-30 years of age (85%). Mean gestation age was 38.09 weeks while mean AFI was 10.55 cm (Table 1). Oligohydramnios was

defined as AFI less than 7 cm, and was seen in 16 cases. Persistence of oligohydramnios even after treatment was seen in 7 cm out of 16 (43.8%) cases. When compared in all patients, caesarean section rates were slightly higher in cases with oligohydramnios, however, the difference was non-significant (p value = 0.22). In 6 cases of AFI less than 7 cm, cesarean section was done out of which one case was done for oligohydramnios. Caesarean section rates were higher in cases with persistence of oligohydramnios as compared to cases where oligohydramnios has been managed successfully, however it was statistically not significant (p value = 0.302). No difference was seen in the incidence of meconium staining of liquor between the cases with and without oligohydramnios at the start of the study (p value = 0.25). Similarly, no difference was seen in the incidence of meconium staining of liquor in the treated cases (p value = 0.43) (Table 2). NICU admission rate was significantly higher in cases with oligohydramnios compared to normal AFI mothers (p<0.01). But in treated cases, this difference was statistically not significant. Mean birth weight was significantly lower in cases of oligohydramnios in all as well treated cases of oligohydramnios (Table 3). Birth weight below 2.5 kg was seen in 6 out of 16 cases (37.5%) with low AFI as compared to 11 out of 84 cases (13.1%) with normal AFI. Birth weight below 2.5 Kg was seen in 3 out of 7 cases (42.9%) with persistence of low AFI as compared to 3 out of 9 cases (33.3%) with improved AFI. APGAR scores at 1 and 5 minutes were not statistically different in patients with AFI less than or higher than 7 cm. Similar results were seen in treated cases of oligohydraminos as well.

DISCUSSION

Oligohydramnios in the antepartum period has been associated with intrauterine growth restriction, post-dated pregnancy and abnormal antepartum foetal heart rate patterns. The present study was conducted to assess the AFI in low risk pregnancies between 36 and 40 weeks of gestation and to correlate it with neonatal outcome at birth. It was found that antepartum oligohydramnios (AFI < 7 cm) was associated with low birth weight of the babies, higher admission rate to NICU and low APGAR score at 1 min. The outcome was worse in cases with persistence of oligohydramnios even after treatment. Persistent of oilgohydramnios affected the birth weight of babies. Incidence of caesarean sections in this group is also more as compared to patients with normal AFI. Thus low AFI and more specifically persistence of low AFI can be used as a prognostic marker for risk of poor neonatal outcome.

In present study, caesarean section rates were slightly higher in cases with oligohydramnios and in those with persistence of oligohydramnios despite treatment. Most common indication for caesarean section was fetal distress in our study. Previously published studies have also shown higher rates of caesarean sections in pateints with low AFI. The study also found oligohydramnios to be a significant predictor of low birth weight of babies, which is similar to the findings of Singhal et al, who observed that AFI less than 5 cm was significantly associated with low birth weight. Locatelli et al reported that uncomplicated term pregnancies with oligohydramnios independently increased the risk for a small for gestational age baby. Furthermore, Morris et al demonstrated that oligohydramnios had an association with growth restriction.

Our study did not find any difference in APGAR score at 5 minutes between the cases with and without oligohydramnios and in cases with persistence of oligohydramnios. Previous authors have suggested that antepartum oligohydramnios is not a predictor of adverse perinatal outcome as measured by low Apgar score. Good outcome in such cases may be due to the aggressive antepartum and intrapartum management. Moreover, significant proportion of neonates with poor Apgar score have an AFI more than 5 cm, which indicates that other investigations of fetal wellbeing are necessary to predict an adverse outcome. In the study by Bhagat et al 16 % of women in low AFI group and 14.9 % women in normal AFI group had meconium-stained liquor, though the difference was not statistically significant. Similarly, Voxman et al concluded that there was no difference between the groups with regard to meconium-stained liquor, which was comparable to the results of our study. Furthermore, NICU admission rate were slightly higher in cases with oligohydramnios as compared to normal cases in our study. Bachhav et al in their study also observed high NICU admission rate among cases with oligohydramnios. This was supported by Al Salem et al who observed that there was statistically significant increasing in admission to NICU in the oligohydramnios group.

Our study has a few limitations. This being a single centre study, that too from a tertiary care center, our results cannot be generalized to other patient populations. Secondly, small sample size can also limit the applicability of the results of our study.

CONCLUSION

Oligohydramnios should be promptly diagnosed and managed as persistence of low AFI is associated with poor maternal and fetal outcome. Our results show that low AFI and more specifically persistence of low AFI can be used as an adjunct to other fetal surveillance methods to help in identification of infants at risk of poor perinatal outcome. Future multi-centric studies should evaluate the predictive role of AFI in high risk pregnancy cases as well.

Table 1. Baseline characteristics of the patients included in the study

Variables	n
Age distribution (in years)	
18-20	10
21-25	39
26-30	46
31-35	5
Mean age = 24.9 ± 4.07 years	
Mean Gestational age = 38.09 ± 1.09 years	
Amniotic fluid index	
<7	16
7-10	41
11-13	21
>13	22
Mean amniotic fluid index = 10.55 ± 4.71	

Table 2. Association of mode of delivery, liquor staining and intensive care unit admission with amniotic fluid index

	Amniotic Fluid Index (n=100)			Amniotic Fluid Index after treatment (N=16)		
	< 7	≥ 7	p value	< 7	≥ 7	p value
Mode of delivery*						
Vaginal	10	65	0.22	3	7	0.30
LSCS	6	19		4	2	
Liquor						
Clear	12	73	0.25	6	9	0.43
Meconium stained	4	11		1	0	
Neonatal intensive care unit admission						
Yes	10	6	<0.01	4	2	0.30
No	6	78		3	7	

*all values are number of patients

Table 3. Association of body weight and APGAR at 1 and 5 minutes with amniotic fluid index

	Amniotic Fluid Index (n=100)			Amniotic Fluid Index after treatment (n=16)		
	< 7	≥ 7	p value	< 7	≥ 7	p value
Birth weight*	2.53 ± 0.43	3.01 ± 0.37	0.014	2.37 ± 0.43	2.70 ± 0.44	<0.05
APGAR 1#	7.38 ± 0.89	7.64 ± 0.69	0.17	7.22 ± 0.79	7.53 ± 0.97	0.45
APGAR 5##	8.63 ± 0.81	8.70 ± 0.53	0.63	8.56 ± 0.76	8.71 ± 0.88	0.71

*all values are in mean and standard deviations; #APGAR at 1 minute; ##APGAR at 5 minutes

REFERENCE

1. Rosati P, Guariglia L, Cavaliere AF, Ciliberti P, Buongiorno S, Ciardulli A, Cianci S, Vitale SG, Cignini P, Mappa I. A comparison between amniotic fluid index and the single deepest vertical pocket technique in predicting adverse outcome in prolonged pregnancy. Journal of prenatal medicine. 2015 Jan;9(1-2):12.
2. Nicolini U, Fisk NM, Rodeck CH, Talbert DG, Wigglesworth JS. Low amniotic pressure in oligohydramnios—Is this the cause of pulmonary hypoplasia?. American journal of obstetrics and gynecology. 1989 Nov 1;161(5):1098-101.
3. Banks EH, Miller DA. Perinatal risks associated with borderline amniotic fluid index. American journal of obstetrics and gynecology. 1999 Jun 30;180(6):1461-3.
4. Jandial C, Gupta S, Sharma S, Gupta M. Perinatal Outcome After Antepartum Diagnosis of Oligohydramnios at or Beyond 34 Weeks of Gestation.
5. Singhal SR, Gupta R, Sen J. Low Amniotic Fluid Index as a Predictor of Adverse Perinatal Outcome â An Indian Perspective. Clinics in Mother and Child Health. 2015.
6. Locatelli A, Vergani P, Toso L, Verderio M, Pezzullo JC, Ghidini A. Perinatal outcome associated with oligohydramnios in uncomplicated term pregnancies. Archives of

gynecology and obstetrics. 2004 Jan 1;269(2):130-3.
7. Morris JM, Thompson K, Smithey J, Gaffney G, Cooke I, Chamberlain P, Hope P, Altman D, MacKenzie IZ. The usefulness of ultrasound assessment of amniotic fluid in predicting adverse outcome in prolonged pregnancy: a prospective blinded observational study. BJOG: An International Journal of Obstetrics & Gynaecology. 2003 Nov 1;110(11):989-94.
8. Voxman EG, Tran S, Wing DA. Low amniotic fluid index as a predictor of adverse perinatal outcome. Journal of perinatology. 2002 Jun 1;22(4):282-.
9. Bhagat M, Chawla I. Correlation of amniotic fluid index with perinatal outcome. The Journal of Obstetrics and Gynecology of India. 2014 Feb 1;64(1):32-5.
10. Voxman EG, Tran S, Wing DA. Low amniotic fluid index as a predictor of adverse perinatal outcome. Journal of perinatology. 2002 Jun 1;22(4):282-.
11. Bachhav AA, Waikar MR. Low amniotic fluid index at term as a predictor of adverse perinatal outcome. Journal of Evolution of Medical and Dental Sciences. 2013 Sep 23;2(38):7221-7.
12. Al-Salem[1] AH, Naga[1] MI, Alnosair[1] AA, Abdallah[1] MR. Neonatal gangrene of the extremity: a report of three cases and review of the literature. Continuing Medical Education (CME). 2015;9(2):1-52.