Original Article

To Analyze the Significance of Reduced Amniotic Fluid Index in Pregnancy and its Correlation with Perinatal Outcome

Saira Talpur[1], Sehrish Kahn[2], Amber Abbasi[3], Shazia Awan,[4] Khalida Avesis[5], Tasneem Kousar[6]

[1-3,5] Consultant Gynecologist, Gynae and OBS department, LUH Jamshoro
[4]Assistant Professor of gynae and OBS, LUMHS Hyderabad/Jamshoro
[6]Assistant Professor, Pediatric department, Roshan Medical College Tando Adam

Correspondence: *Dr.Saira Talpur*
Consultant Gynecologist, Gynae and OBS department, LUH Jamshoro

Abstract

Objective: To assess the effects of reduced amniotic fluid index (AFI) at term gestation on perinatal outcome.

Methodology: This cross-sectional was conducted in Gynaecology and obstetrics Unit-III, at Liaquat University Hospital Hyderabad from 13 September 2015 to 12 March 2016. It is comprised of 72 patients having decreased amniotic fluid levels with gestational amenorrhea between 37-42 weeks, admitted in active labour through casualty and outpatient department of Liaquat University Hospital Hyderabad. All pregnant women with singleton pregnancy and decrease amniotic fluid levels with gestational amenorrhea of 37-42 weeks were included in this study. In addition to that, the neonates of these women were observed for one week after birth by enquiring their condition through phone calls.

Results: The mean age of the patients 30±3.1 years. Most of the patients were multipara 45.85%. Amniotic fluid index on ultrasound measured 3-4cm was women 51.38% cases, 1-2cm in 13.88% and 5-6cm in 34.72% of the women. APGAR score in 5min was observed < 6 in 51.38% cases and > 6 in 45.83%, whereas 2.77% were stillbirth with APGAR 0. Neonatal outcome at the end of 1st week of life, from 70 alive infants 30 who needed NICU care 10(14.28%) had birth asphyxia, 14(20%) had respiratory distress (these 24 neonates were lost from follow-up after one week) and 06(8.5%) died. Whereas other 40 neonates were remaining normal at the end of 1st week.

Conclusion: Oligohydramnios at term gestation increase the risk of cesarean delivery and increase NICU admission due to low APGAR score so the assessment of low amniotic fluid index at term gestation is a good predictor of adverse prenatal outcome.

Keywords: Oligohydramnios, Neonates. Perinatal Outcomes

Cite this article as: Talpur S, Kahn S, Abbasi A, Awan S, Avesis K, Kousar T. To Analyse the Significance of Reduced Amniotic Fluid Index in Pregnancy and its Correlation with Perinatal Outcome. J Soc Obstet Gynaecol Pak. 2021; 11(3):217-219.

Introduction

During the fetal intrauterine life, amniotic fluid is a protecting fluid in the amniotic sac of a gravid uterus, which plays many important functions to become part of a marker of a fetoplacental functioning unit. [1] There are two different types of amniotic fluid abnormalities.[2] It is mostly composed of solids and water, such as carbohydrates, proteins, enzymes, lipids and phospholipids and hormones, and chemical compounds like as uric acid, electrolytes, urea and creatinine. Polyhydramnios is defined as an excessive amniotic fluid amount with an Amniotic Fluid Index (AFI) higher than 24 cm. The second condition is oligohydramnios, which is defined as a reduced AFI of less than 5cm.[2] The assessment of the amniotic fluid testing is critical in cases of meconium aspiration, foetal distress, IUGR, non-reassuring rate of heart pattern of the foetus, low birth weight, birth asphyxia, low Apgar scores, at the admission in NICU.[3] Pregnancies with a high risk of miscarriage are managed using ultrasound measurements of amniotic fluid content.

Pregnancy problems have been linked to both low and higher amniotic fluid volumes.[4] The oligohydramnios in the context of a problematic pregnancy is linked to a higher risk of poor consequences, such as NICU admission, meconium aspiration syndrome (MAS), meconium staining of amniotic fluid, higher rate of caesarean delivery and the Apgar score <7 at five minutes, < 7.10 pH of the umbilical cord blood, pre-term births, low birth weight and respiratory distress syndrome.[5-7] Approximately 8% of the women during pregnancy have lower concentration of the fluid, with approximately 4% identified as oligohydramnios. [8] On the other hand, oligohydramnios was discovered in around 1 in 150 pregnancies in the First Look Trial from the Guatemala, Zambia, Pakistan and the Democratic Republic of Congo, including nearly 13,000 females who had a trimester of pregnancy as per ultrasound screening.[9] Early diagnosis and treatment of oligohydramnios may result in lower perinatal morbidity and death and decreases in caesarean deliveries rate on other side. Nevertheless, there are conflicting data regarding perinatal outcome on the significance of isolated oligohydramnios.[5,10,11] This study aimed to determine the effects

Authorship Contribution: [1,3]Substantial contributions to the conception or design of the work, acquisition, analysis, or interpretation of data for the work, [2,5]Drafting the work or revising it critically for important intellectual content, [4,6] Active participation in active methodology, [6]Final approval of the version to be published.

Funding Source: none
Conflict of Interest: none

Received: Feb 18, 2021
Accepted: Aug 04, 2021

of reduced amniotic fluid index (AFI) at term gestation on perinatal outcome.

Methodology

This was a descriptive cross-sectional was done department of Gynaecology & Obstetrics Ward- III at Liaquat University Hospital Hyderabad from 13 September 2015 to 12 March 2016. All pregnant women with singleton gestation and decrease amniotic fluid levels with gestational amenorrhea of 37-42 weeks, all the neonates of selected mothers were observed until 7 days after birth were included. All the preterm pregnancies less than 37 weeks of gestation, twin pregnancies, medical disorders (chronic hypertension, cardiac disease, known case of diabetes mellitus and haemoglobinopathies), rupture of membranes, diagnosed cases of fetal anomalies such as esophageal atresia, renal agenesis were excluded. Written informed consent was obtained from all patients and women then undergo the ultrasound examination to confirm the clinical findings and amniotic fluid index estimation.

Preferably, sonologists were selected for the ultrasound of all women to reduce the interoperation errors. The effects of 56 confounding factors were eliminated by stratification of data. In addition the neonates of these ladies were observed for one week after birth by enquiring their condition through phone calls. Finally, all the collected information was entered in the predesigned proforma. After collection of data was analyzed through SPSS software version 26.0 version.

Results

Total 72 patients enrolled in this study; their mean agewas 30±3.1 years. Most of the patients were multipara 33(45.85%) followed by 27 (37.5%) prim paraand 12 (16.66%) were grand multipara. Amniotic fluid index on ultrasound measured 3-4cm in majority of women 37(51.38%), 1-2cm in 10 (13.88%) and 5-6cm in 25(34.72%). Regarding mode of delivery majority 35 (48.61%) delivered by LSCS and 27(37.5%) delivered vaginaly, 10(11.11%) had instrumental delivery. APGAR in 5min was observed < 6 in 37 (51.38%) and > 6 in 33(45.83%) whereas 2(2.77%) were still birth with APGAR 0. out of 70alive birth 30(41%) had >2.5 kg weight and 40(55%) had <2.5 kg weight whereas 2(2.77%) still birth also had <2.5kg. (Table I)

Fetal outcome in relation to AFI out of 70 alive birth 8 (11.11%) had 1-2cm AFI, 37(51.38%) had 3-4 cm AFI and 25(34.72%) had 5-6 cm AFI whereas 2 still birth with AFI 1-2cm. (Table II)

Whereas out of those 70 live births 30 were admitted in NICU had AFI 1-2cm in 8(11.11%), AFI 3-4cm in 12(16.66%) and AFI 5-6cm in 10(13.88%) infants. Neonatal outcome at the end of 1st week of life, from 70 alive infants 30 who neededNICU care 10 (14.28%) had birth asphyxia, 14(20%) had respiratory distress (these24 neonates were lost from follow-up after one week) and 06(8.5%) died. Whereasother 40 neonates were remaining normal at the end of 1st week. (Table III)

Table I:. Descriptive statistics of demographic characteristics and fetal outcome (n=72)

Variables		No	(%)
Age groups	18-30 years	39	54.16%
	31-45 years	33	45.83%
Parity	Primipara	27	37.5%
	Multipara	33	45.85%
	Grand-multipara	12	16.66%
AFI Index	AFI 0-2	10	13.88%
	AFI 3-5	37	51.38%
	AFI >5	25	34.72%
Mode of delivery	NVD	27	37.5%
	Instrumental delivery	10	13.88%
	LSCS	35	48.61%
Apgar score in 5 mints	Apgar score 0	02	2.77%
	Apgar score <6	37	51.36%
	Apgar score >6	33	45.83%
Fetal weight	<2.5kg	42	58.22%
	≥2.5kg	30	41.88%
Fetal outcome	Alive	70	97.22%
	Still birth	2	2.77%
	NICU	37	51.38%

Table II: AFI on ultrasound according to Apgar score (n=72)

AFI index on ultrasound (in cm)	APGAR score in 5min	No.	(%)
AFI 0-2	**APGAR** <6	06	8.33%
	APGAR >6	02	2.77%
	APGAR 0	02	2.77%
AFI 3-5	**APGAR** <6	20	27.77%
	APGAR >6	17	23.65%
AFI >5	**APGAR** <6	07	9.72%
	APGAR >6	18	25.0%

Table III: Fetal outcome in relation with AFI (n=72)

Fetal outcome	AFI	No. of patients	(%)
ALIVE	1-2cm	8	11.11%
	3-4 cm	37	51.38%
	5-6cm	25	34.72%
STILLBIRTH	1-2cm	2	2.77%
	3-4cm	--	--
	5-6cm	--	--
NICU	1-2cm	8	11.11%
	3-4cm	12	16.66%
	5-6cm	10	13.88%

Discussion

The measurement of the volume of the amniotic fluid during pregnancy has found to be a useful tool for detecting who is at risk for a poor neonatal outcome. In this study, the mean age was 30+3.1 years. Most of the patients were multipara 33 (45.85%) followed by 27 (37.5%) primpara and 12 (16.66%) grand multipara. In comparison to our results, a study conducted by Ghimire S et al[12] reported that 68% of women with oligohydramnios were in the age group 20–29 years with mean maternal age of 23.98 ± 3.89 years, while inconsistently, 58% were primigravida followed by 37% multigravidas. However, another study carried out by Jagatai et al[13] reported that the incidence of oligohydramnios was higher in primipara in whom it was 52%, which is comparable to the study of Jandial et al[14] and Petrozella et al[15] who showed that the

incidence of oligohydramnios was 60.0% in primipara which is similar to our study.

In the present study, the majority of the cases 35 (48.61%) delivered by LSCS and 27(37.5%) delivered vaginally, 10(11.11%) had instrumental delivery. Similarly, Nazlima and Fatima et al[8] found that 71% of women underwent LSCS in oligohydramnios group. The reason for the higher incidence of cesarean section in our study was that the indication for cesarean section was isolated hydramnios. It is a widely held assumption that decreases in liquor is linked to several complications in terms of newborn asphyxia from meconium aspiration syndrome, intrauterine growth retardation and mortality.

In our set-up, there are not enough facilities for intrapartum monitoring and adequate neonatal care. Hence, to avoid this crisis, we consider anhydramnios as an indication for cesarean section, which could have been deferred if better monitoring facilities were available. According to a study[16] from Sir Gangaram Hospital, 68% of induced individuals with Oligohydramnios had vaginal deliveries and 32% had caesarean sections, which is similar to our findings. According to Manzanares S et al[17], 84% of induced Oligohydramnios cases were delivered vaginally, while 16% were delivered via caesarean section.

In this study, neonatal outcome at the end of 1st week of life, from 70 alive infants 30 who needed NICU care 10 (14.28%) had birth asphyxia, 14(20%) had respiratory distress (these 24 neonates were lost from follow-up after one week) and 06(8.5%) died. A study conducted by Kansara et al[18] showed that babies born to women having oligohydramnios had lower birth weights and were delivered at an earlier gestational age. Another study conducted by Jagatia K et al[13] reported that the presence of oligohydramnios was linked to a greater rate of growth retardation and admission to the NICU. One baby died by septicemia in the NST Reactive group, while another died caused by the HMD and LBW. Both newborns in the NST Non-Reactive group died caused by the acute respiratory distress syndrome + meconium aspiration syndrome. Another study conducted by Talesara H et al[19] reported there was no maternal mortality, while 26% admission in NICU for lower birth weight, meconium aspiration syndrome 8%, prematurity 20% and 8% congenital abnormalities. Oligohydramnios is linked to an increased risk of pregnancy problems and perinatal morbidity and death. AFI measurements during the periods of antepartum or intrapartum can assist in identifying women who require additional antepartum surveillance for pregnancy difficulties, and these women should be handled in a separate unit to successfully address the complications.[8]

Conclusion

As per study conclusion the increased risk of caesarean birth and NICU hospitalization associated with oligohydramnios at term gestation, the evaluation of low amniotic fluid index at term gestation is a good predictor of unfavorable prenatal outcome. On this subjects, more large-scale research is recommended.

References

1. Vyas A, Prasanna G, Dash S, Rath S. Comparison of Perinatal and Maternal Outcomes in Borderline Versus Normal Amniotic Fluid Index in a Tertiary Care Center in Odisha: An Observational Prospective Study. Cureus. 2021 Nov 24;13(11).
2. Bakhsh H, Alenizy H, Alenazi S, Alnasser S, Alanazi N, Alsowinea M, Alharbi L, Alfaifi B. Amniotic fluid disorders and the effects on prenatal outcome: a retrospective cohort study. BMC pregnancy and childbirth. 2021 Dec;21(1):1-7.
3. Chaudhary R, Dhama V, Singh S, Singh M. Correlation of reduced amniotic fluid index with neonatal outcome. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2017 Jun 1;6(6):2401-7.
4. Simmons PM, Whittington JR, Estrada SM, Ounpraseuth ST, Shnaekel KL, Slaton KB, Magann EF. What is the Impact of Abnormal Amniotic Fluid Volumes on Perinatal Outcomes in Normal Compared with At-Risk Pregnancies?. International Journal of Women's Health. 2020;12:805.
5. Rabie N, Magann E, Steelman S, Ounpraseuth S. Oligohydramnios in complicated and uncomplicated pregnancy: a systematic review and meta-analysis. Ultrasound in Obstetrics & Gynecology. 2017 Apr;49(4):442-9.
6. 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: 630–634.
7. Venturini P, Contu G, Mazza V, Facchinetti F. Induction of labor in women with oligohydramnios. J Matern Fetal Neonatal Med 2005; 17: 129–132.
8. Nazlima N, Fatima B. Oligohydramnios at third trimester and perinatal outcome. Bangladesh Journal of medical science. 2012;11(1):33-6.
9. Figueroa L, McClure EM, Swanson J, Nathan R, Garces AL, Moore JL, Krebs NF, Hambidge KM, Bauserman M, Lokangaka A, Tshefu A. Oligohydramnios: a prospective study of fetal, neonatal and maternal outcomes in low-middle income countries. Reproductive Health. 2020 Dec;17(1):1-7.
10. Gaikwad PR, Oswal MS, Gandhewar MR, Bhatiyani BR. Perinatal outcome in oligohydramnios and borderline amniotic fluid index: a comparative study. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2016 Jun 1;5(6):1964-9.
11. Melamed N, Pardo J, Milstein R, Chen R, Hod M, Yogev Y. Perinatal outcome in pregnancies complicated by isolated oligohydramnios diagnosed before 37 weeks of gestation. Am J Obstet Gynecol 2011; 205: 241.e241–241.e246
12. Ghimire S, Ghimire A, Chapagain S, Paudel S. Pregnancy outcome in cases of oligohydramnios after 28 weeks of gestation. International Journal of Advanced Medical and Health Research. 2016 Feb 1;3(2):68.
13. Jagatai K, Singh N, Patel S. Maternal and fetal outcome in oligohydramnios: A study of 100 cases. Int J Med Sci Public Health 2013;2:724-7.
14. Jandial C, Gupta S, Sharma S, Gupta M. Perinatal outcome after antepartum diagnosis of oligohydraminos at or beyond 34 weeks gestation. J K Sci 2007;9:213-4.
15. Petrozella LN, Dashe JS, McIntire DD, Leveno KJ. Clinical significance of borderline amniotic fluid index and oligohydramnios in preterm pregnancy. Obstet Gynecol 2011;117 (2 Pt 1):338-42.
16. Umber A. Perinatal Outcome in Pregnancies Complicated by Isolated Oligohydramnios at Term. Annals 2009;15:35-37.
17. 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):221-4
18. Kansara VM, Kadakar KD, Chikani AS, Pateliya PA. The association between isolated oligohydramnios at term and pregnancy outcome and perinatal outcome in case of isolated oligohydramnosis: a retrospective analysis. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2022 Jan 1;11(1):136-41.
19. Talesara H, Shah VC, Modi DA, Modi RS. Fetomaternal outcome in pregnancy with oligohydramnios: a prospective study. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2021 Feb 1;10(2):571-5