International Journal of Medical and Health Research
ISSN: 2454-9142
www.medicalsciencejournal.com
Volume X; Issue X; March XXXX; Page No. XX-XX

Assessment of perinatal outcome using Amniotic Fluid Index and Color of Liquor: A Prospective Study

[1] Dr. Swati Bhargava, [*2] Dr. Sujata Bhargava, [3] Dr. Jyoti Bindal

[1] Assistant Professor, Department of Obstetrics & Gynecology, RD Gardi Medical College, Ujjain, Madhya Pradesh, India

[2] Associate Professor, Department of Obstetrics & Gynecology, Sri Aurboindo Institute of Medical Sciences, Indore, Madhya Pradesh, India

[3] Professor & Head, Department of Obstetrics & Gynecology, GR Medical College, Gwalior, Madhya Pradesh, India

[*] Corrosponding Author: Dr. Sujata Bhargava

Abstract

Background: It is well recognized that consequence of labour even in patients with low risk can lead to foetal morbidity and mortality. Oligohydramnios during antepartum period has been associated with intrauterine growth restriction. With the advancing gestational age amniotic fluid volume is known to reduce.

Aims and Objective: To assess perinatal outcome using amniotic fluid index (AFI) and color of liquor in antenatal women.

Materials and Method: Two hundred and fifty antenatal women were studied having gestational age between 37 to 42 weeks. Detailed history including age, gestational age, parity and mode of delivery was recorded. After thorough clinical examination, AFI was recorded. Patients were divided based on AFI as Group 1 (<5), Group 2 (5-8) and Group 3 (>8). Presence of meconium stained liquor was also recorded in all patients.

Result: Most common age group was 21-25 years (48%). Most of the patients had gestational age between 40-42 weeks (56%). Maximum patients had AFI >8 (80%) and were multipara (54%). Meconium stained liquor was found in 32% patients. Out of 62 babies who had birth weight ≤2.5, most of them had AFI >8 (n=39) also, out of 188 babies delivered with birth weight of >2.5 kg, most of them had AFI >8 (n=160). Babies with Apgar score ≤7, 30 had AFI >8 similarly babies with Apgar score <7, 165 had AFI >8.

Conclusion: AFI and presence of meconium in the liquor significantly determine the fetal health.

Keywords: amniotic fluid index, AFI, gestational age, liquor, perinatal outcome

Introduction

Amniotic fluid plays a very important role in the development of embryo and fetus. Fetus protection from shock and possible extraneous injury is the main function of amniotic fluid. Amniotic fluid also maintains temperature, helps in growth and free movement of fetus [1, 2].

Normal measurement of amniotic fluid at term is 600-800 ml. Amniotic fluid index (AFI) is a sonographic assessment of amniotic fluid volume. AFI is measured as sum of 4 quadrant deepest vertical amniotic fluid pockets in the gravid uterus which is free of umbilical cord and fetal parts [3, 4].

Meconium is a semisolid viscous material which contain water (72.4 to 80%), polysaccharides, lipids, more than 32 steroids and proteolytic enzymes [5]. Abnormal colour of amniotic fluid is green when it is meconium stained. Incidence of meconium staining increases with gestational age, it rises from 2% in 37 weeks to 44% in 42 weeks [1, 5, 6].

The present study was performed to assess perinatal outcome using amniotic fluid index (AFI) and color of liquor in antenatal women.

Material and Methods

An observational prospective study was done including 250 antenatal women having gestational age between 37-42 weeks.

Women with singleton pregnancy with non-anomalous fetus with intact membrane at the time of testing were included whereas pregnancies associated with premature rupture of membranes, known fetal or chromosomal anomalies, multiple pregnancies, gestational diabetes, Rh incompatibility andplacental anomalies were excluded from this study.

Using four-quadrant technique quantification of amniotic fluid was done as described by Phelan *et al*. [7] All the patients were divided into three groups according to the volume of amniotic fluid, determined as amniotic fluid index as Group 1 (AFI < 5), Group 2 (AFI between 5.1 and 8) and Group 3 (>8).

Presence or absence of meconium in the amniotic fluid was also recorded. Intrapartum events and fetal parameters as mode of delivery, birth weight, Apgar score at 1 and 5 min were recorded at the time of birth.

All the data was analyzed using IBM SPSS Ver. 20. Data is expressed as number of patients and percentage. Frequency distribution and cross tabulation was used to form table. Categorical data was analyzed using Chi square test. Level of significance was assessed at 5%.

Results

Out of 250 patients, in Group 1, Group 2 and Group 3 there

were 32 (12.8%), 18 (7.8%) and 200 (80%) patients respectively. Maximum patients belong to age group of 21-25 years [120 (48%)] with mean age of 25.32±22.43 years. About half of the patients were primigravida [115 (46%)].

Meconium stained liquor was found in 80 (32%) patients, while in 170 (68%) patients liquor was clear. Most of the patients delivered at gestational age of 40-42 [140 (56%)] weeks followed by 37-40 weeks [110 (44%)]. Vaginal delivery [175 (70%)] was the most common mode of delivery observed followed by 75 (30%) women who had instrumental delivery or LSCS ($p<0.05$).

Table 1: Distribution according to age, gestational age, parity and liquor status in study cohort

Parameter		Group 1 (n=32)	Group 2 (n=18)	Group 3 (n=200)	Total (n=250)*	P value
Age	16-20	11	5	37	53 (21.2)	NS
	21-25	14	9	97	120 (48)	
	26-30	4	2	55	61 (24.4)	
	31-35	3	2	11	16 (6.4)	
Gestational age	37-40	10	8	92	110 (44)	<0.001
	40-42	22	10	108	140 (56)	
Parity	Primi	18	9	88	115 (46)	NS
	Multi	14	9	112	135 (54)	
Liquor	Clear	13	10	147	170 (68)	<0.001
	Meconium	19	8	53	80 (32)	

Data is expressed as number of patients,*data is expressed as number of patients (percentage), AFI; amniotic fluid index, NS; not significant, Group 1; AFI <5, Group 2; AFI 5-8, Group 3; AFI>8, P value <0.05 is considered as significant

Table 2: Comparing AFI with birth weight

Birth weight (kg)	Group 1 (n=32)	Group 2 (n=18)	Group 3 (n=200)	Total (n=250)	P value
≤2.5	17(53.12)	6 (33.33)	39 (19.5)	62 (24.8)	<0.002
>2.5	15 (30)	12 (66.66)	161 (80.5)	188 (75.2)	

Data is expressed as number of patients, AFI; amniotic fluid index, Group 1; AFI <5, Group 2; AFI 5-8, Group 3; AFI>8, P value <0.05 is considered as significant

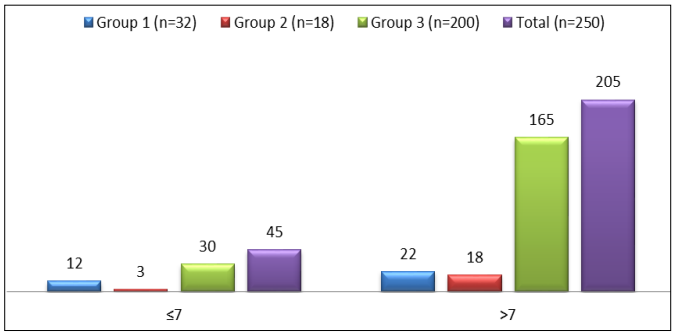

Fig 1: Comparing AFI with Apgar score

Discussion

Measurement of amniotic fluid volume is very important for foetal well being in the course of pregnancy. If AFI is more than 8 cms it can be repeated weekly. However evaluation can be performed twice weekly if AFI is between 8 and 5 cms. High incidence of meconium staining liquor and foetal distress was recorded in patients who had AFI ≤5 cms. This suggests strong consideration for induction of labour in patients whose AFI values drop to 5-7cms range on repetitive testing.

In present study there was no influence of age and parity over the amniotic fluid volume. Out of 250 patients, in Group 1, Group 2 and Group 3 there were 12.8%, 7.8%, 80% patients respectively suggesting that oligohydramnios was found in 12.8% patients. But study done by Phoolchandra *et al*, Elliot *et al* and Casey *et al* reported 31.25%, 54% and 42% patients with oligohydramnios which is quite high compared to present study findings [8].

Meconium stained amniotic fluid has been implicated as a factor for foetal well being during latent labour and intrapartum period which require close monitoring. In present study 32% patients has found to have Meconium stained liquor. In 1987 Rutherford *et al* [9] reported presence of meconium stained with oligohydramnios in about 54% patients which is higher than what is reported in present study. Baron *et al* in similar study reported significantly less meconium stained amniotic fluid in patients with oligohydramnios compared to patients with normal AFI [10]. whereas Voxman *et al* [11] observed no difference between the groups with regard to meconium-stained liquor. But in present study incidence of meconium-stained liquor was higher in Group 3 with AFI >8 compared to Group 1 and 2. A meta-analysis by Chauhan *et al* [12] found that intrapartum AFI ≤5 was significantly associated with increased risk of cesarean section for fetal distress. Similarly results were depicted in present study.

In the current study, birth weight<2.5 kg was found in 17 (53.12%) patients in Group 1 versus 39 (19.5%) patients in Group 3 ($p=0.002$). In a similar study by Locatelli *et al* [13] reported that in uncomplicated term pregnancies with oligohydramnios, AFI <5 significantly increased the risk of SGA infant. Another study by Morris *et al* [14] reported that in Group with AFI <5, 60% of the babies were of low birth weight which suggest that oligohydramnios is linked with growth restriction. Strengthening the results obtained by present study Rutherford *et al* [9] showed that when the AFI was <5, pregnancies resulted in infants with intra uterine

growth restriction (IUGR).

In present study Apgar score at 1 and 5-min was ≤7 in 12 (26.66%) in Group 1 whereas in Group 2 only 6.67% babies has1 and 5-min Apgar score <7, but in Group 3, 30 (66.67%) babies has has1and 5-min Apgar score <7 (p=0.001) which is in agreement with the study done by Chauhan *et al* [12] and Driggers *et al* [15] reported a 5-min Apgar score <7 in 3.8% patients in a oligohydramnios group (AFI<5) compared to 4.6% in normal AFI group. Grubb *et al* [16] revealed 1-min Apgar score <7 in 84% patients with AFI <5 compared to 14% in normal AFI group (p=0.001). In the same study, the 5-min score <7 was seen in 13 % patients with AFI <5 versus 5 % in the normal AFI group. Present study had few limitation of being less in sample size; a large clinical trial is required to strengthen the present study findings.

Conclusion

Amniotic fluid is an essential parameter to assess fetal status. Abnormal value of amniotic fluid index and presence of meconium stained liquor are important factors determining the fetal compromise. Therefore, close monitoring of these factors and intervening at the earliest stage of compromise can help improve the prognosis of fetal status.

References

1. Girija MK, Marisiddaiah M. Correlation of amniotic fluid index and color of liquor with perinatal outcome. Journal of Global Biosciences. 2014; 3(2):578-581.
2. Southern EM; F *et al* Anoxia and its possible relation to changes in the prenatal fetal electrocardiogram 1957, AM J ObstGyne, 73; 233.
3. Kubli FW, Kaeser O, Kinselma M. Diagnostic management of chronic placental insufficiency in Pecile, A, and Finzi, C, editors; The fetoplacental unit, Amsterdam, Exerpta Medical Foundation, 1969, 323-339.
4. Willis DC, Blanco JD, Hamblen KA. The non-stress test: criteria for the duration of foetal heart rate acceleration, J Reprod Med, 1990; 35:901-903.
5. Moore TR. Clinical assessment of amniotic fluid 1997 Clinical ObstGyneLippincottRaven Publishers; 40(2):302-313.
6. Nijhuis JG, Prechtl FR, Martin CB. Jr and Bots RS; Are there behaviouralstatesin the human fetus? Early Hum dev, 1982; 6:177.
7. Phelan JP, Ahn MO, Smith CV, *et al*. Amniotic fluid index measurements during pregnancy. J Reprod Med. 1987; 32:601-604.
8. Indira K, Arundathi Devi LA. Mode of delivery and perinatal outcome in oligohydramnios. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS). 2017; 16(11):22-26.
9. Rutherford SE, Phelan JP, Smith CV, *et al*. The four quadrant assessment of amniotic fluid volume: an adjunct to antepartum fetal heart rate testing. Obstet Gynecol. 1987; 70(3):353-6.
10. Baron C, Morgan MA, Garite TJ. The impact of amniotic fluid volume assessed intrapartum on perinatal outcome. Am J Obstet Gynecol. 1995; 173(1):167-74.
11. Voxman EG, Tran S, Wing DA. Low amniotic fluid index as a predictor of adverse perinatal outcome. J Perinatol. 2002; 22(4):282-5.
12. Chauhan SP, Sanderson M, Hendrix NW, *et al*. Perinatal outcome and amniotic fluid index in the antepartum and intrapartum periods: a meta-analysis. Am J Obstet Gynecol. 1999; 181(6):1473-8.
13. Locatelli A, Vergani P, Toso L, *et al*. Perinatal outcome associated with oligohydramnios in uncomplicated term pregnancies. Arch Gynecol Obstet. 2004; 269(2):130-3.
14. Morris JM, Thompson K, Smithey J, *et al*. The usefulness of ultrasound assessment of amniotic fluid in predicting adverse outcome in prolonged pregnancy: a prospective blinded observational study. Br J Obstet Gynaecol. 2003; 110(11):989-94.
15. Driggers RW, Holcroft CJ, Blakemore KJ, *et al*. An amniotic fluid index B5 cm within 7 days of delivery in the third trimester is not associated with decreasing umbilical arterial pH and base excess. J Perinatol. 2004; 24(2):72-6.
16. Grubb DK, Paul RH. Amniotic fluid index and prolonged antepartum fetal heart rate decelerations. Obstet Gynecol. 1992; 79(4):558-60.