



Relationship of Amniotic Fluid Index (AFI) Between Maternal and Perinatal in Patients

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Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

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ABSTRACT

Background: Alcohol amniotic, a protecting fluid that surround the embryo. It protects from concussion, pressure, desiccation, reminiscent of the aquatic origin of life. Adequate amount of amniotic fluid is essential requirement for the normal development and it acts like a cushion against trauma, agitation and accidental impulsions. It has also bacteriostatic properties and prevents the infection of many bacterial infections.

Aim: To assess the maternal and fetal outcome in cases with normal and abnormal Amniotic Fluid Index levels.

Results: The mode of delivery was spontaneous vaginal delivery followed by Assisted VD, Elective CS, Emergency CS respectively. It was affected by amount of liquor since, low AFI group 35 (75%) patients ended up in cesarean section for fetal distress. While in control group 63(18.3%) patients had caesarean section.

Conclusion: Early neonatal death was seen in 0.2%, 4.5% and 70.5% newborns were born to pregnant women with normal AFI, oligohydramnios respectively. 70.5% neonates born to pregnant women with oligohydramnios had NICU admission. All cases were admitted in NICU because of respiratory distress.

Keywords: *Amniotic fluid; fetal nutrients; alcohol; placenta.*

1. INTRODUCTION

Amniotic fluid is a dynamic fluid that gives a protection during the pregnancy and its composition is similar with the fetal plasma on its first trimester. Due to lacking of keratins, there is a higher possibility for bidirectional diffusion for amniotic fluid between the fetus and skin. The amniotic membrane is more permeable to water and solutes and acts as a physiological buffer by extending its support to extracellular compartment [1]. There is no much more dilution or internal pressure due to the increased fetal urination and its volume until 14th week of gestation. Its keratinization starts with 19 – 20th and completed at 25th week of conception. There is a number of factors that determine the formation and removal of the fluid from the membrane after the keratinization begins [1-2].

Amniotic fluid production is directly correlated with the fetal urination and its lung fluid volume. The fetus breath essentially contributes effusion of lung fluid in to the amniotic region. Though, the lungs act main contributors, oral, nasal, and tracheal secretions also increase the volume [1-4]. In addition to, the intra-membraneous pathway carries fluid and solutes in to the fetal circulation through the blood network and placental surface. The trans-membraneous transportation directly involve with the gas exchange between the fetal and maternal blood and minimally affect the amniotic volume [2,4-6]. The fluid volume is mainly regulated by the gestational duration and maintained between a fixed ranges. Its volume increases with week by week and attain the peak on 36 – 38 weeks [2,7]. A delicate balance is maintained between its inflow and outflow in the amniotic cavity [3,5,8-10]. The studies showed the ratio of fluid removal is much more smaller than the inlet and achieving a fine balanced state for physiological smoothness [2,5,6]. Though, governed by such kind of unequal parameters, its volume remained to be in an equilibrium [3,7]. There is in

conclusive results regulating the factors such as fetal urine or lung fluid volume that determine the amniotic fluid volume. Meantime, several studies showed that the intramembraneous pathway play a significant role in retrieving the balanced situation [2-5,7]. Apart from these, few studies also showed that the bacterial biofilms contribute the amniotic equilibrium and acts as an important component for host defense mechanisms [8,9-13].

Amniotic fluid volume homeostasis is maintained by the delicate balance between inflow (fetal urine and to a lesser extend, lung secretion) and outflow (swallowing and intramembraneous absorption) of fluid in the amniotic cavity. Several studies demonstrate that the amount of fluid removed by fetal swallowing is significantly smaller than that produced by fetal urination [2,5,6]. Despite these considerably unequal parameters, amniotic fluid volume remains in relative equilibrium [3]. Several studies suggest that neither lung fluid production nor urination serves as a regulatory role in the control of amniotic fluid volume. Whether fetal swallowing serves a regulatory role remains possible but inconclusive [10,11]. Studies suggest that the is responsible for the correction of imbalances and that it appears to play a significant role in establishing of the amniotic fluid volume [2,12]. It is possible also that aggregates of exfoliated cells from the fetal digestive, respiratory and urinary tracts, amniotic membranes, fetal skin and umbilical cord [14,15] may contribute to the presence of amniotic fluid „sludge“ and participate in the host response during microbial invasion of amniotic cavity.[16]

2. MATERIALS AND METHODS

Five hundred (500) participants study antenatal women with low risk at term who got admitted for safe confinement in the Department of Obstetrics and Gynaecology of BIHER were registered for the study.

Chart 1. Exclusion and inclusion criteria of the study

Inclusion Criteria
Antenatal women at term gestation, Age 25-35 years, Singleton pregnancy, Women are willing to participate in the study.
Exclusion Criteria
High risk pregnancies like preeclampsia, GDM and medical disorders complicating pregnancy, Prolonged pregnancy, Antenatal women with ruptured membrane, Multiple pregnancy, Major fetal anomalies

2. METHODOLOGY

Gestational age is established by history, clinical examination and dating scan. Obstetric scan, AFI were done by following proper instructions and four quadrant technique. The maternal and perinatal outcome of these patients will be assessed and analysed to see the correlation of varying levels of AFI Then the maternal and fetal product is distinguished prospectively and equated. The statistical analysis was done based on Pearson Chi Square method.

3. RESULTS

Mode of delivery in pregnant women with normal AFI is as follows- spontaneous vaginal delivery

(65.8%), Assisted VD(12.8%), Elective CS(6.3%), and Emergency CS(11.8%) Mode of delivery in pregnant women with oligohydramnios is as follows- spontaneous vaginal delivery (16%), Assisted VD (9.1%) Elective CS (2.3%), and Emergency CS(72.9%).

The following are the intrapartum finding in baby born to pregnant women with normal AFI- early deacceleration (0.5%), late deacceleration (1.6%) and Variable deacceleration (3.7%) The following are the intrapartum finding in baby born to pregnant women with oligohydramnios-early deacceleration (2.3%), late deacceleration (56.8%) and Variable deacceleration (34.1%).

Table 1. Mode of delivery in pregnant mothers between groups

		AFI					
		Normal(436)		Oligohydramnios (44)		Polyhydramnios (20)	
		n	%	n	%	n	%
Mode of delivery	Spontaneous VD	267	62.6%	8	13.6%	12	71.0%
	Assisted VD	52	13.8%	4	9.8%	1	5.5%
	Elective LSCS	23	5.3%	1	2.3%	1	5.0%
	Emergency LSCS	58	13.3%	32	72.9%	3	15.0%
IOL		7	1.6%	4	9.1%	0	0.0%

Table 2. Intrapartum findings in pregnant mothers between groups

		AFI					
		Normal (436)		Oligohydramnios (44)		Polyhydramnios (20)	
		n	%	n	%	n	%
Intrapartum	Early Deacceleration	2	0.5%	1	2.3%	0	0.0%
	Late deacceleration	7	1.6%	25	56.8%	0	0.0%
	Variable Deacceleration	16	3.7%	15	34.1%	1	5.0%

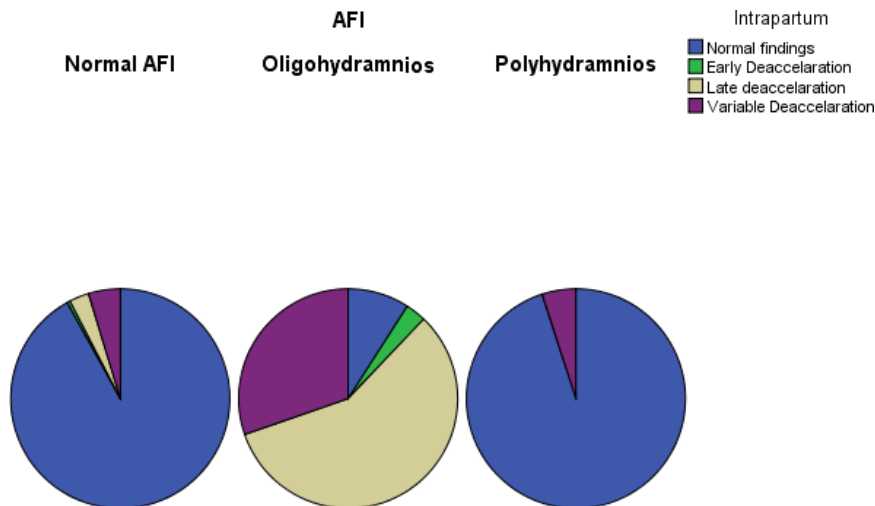


Fig. 1. Intrapartum findings in pregnant mothers between groups

Table 3. Number of days of NICU admission of neonates born to pregnant mothers between groups

	AFI						P Value
	Normal		Oligohydramnios		Polyhydramnios		
	Mean	SD	Mean	SD	Mean	SD	
No. of days of NICU admission	0.2	0.5	1.7	1.7	0.4	0.35	<0.0001

The difference in mean duration of NICU admission for neonates of pregnant women with normal AFI, oligohydramnios and Polyhydramnios was highly statistically significant (p=<0.0001)

Table 4. Comparison of Oligohydramnios and Polyhydramnios

	Oligohydramnios (%)	Polyhydramnios (%)
Marino et al [113]	9	5
Chamberlian et al [174]	7.8	4.3
Present Study	8.2	4

4. DISCUSSION

The presence of the amniotic fluid is a pre requirement for antenatal evaluation and fetal welfare. The present study aimed to evaluate the impact of abnormalities of liquor volume on perinatal outcomes. Among 500 patients screened for AFI, 427(82.7%) of pregnant women had normal AFI, 43(7.3%) had oligohydramnios and 30(10%) had Polyhydramnios. Incidence is similar to those reported by several studies. [17]

The mode of delivery in our study significantly affected by amount of liquor. In low AFI group 35 (75%) patients ended up in cesarean section for fetal distress. While in control group 63 (18.3%) patients had caesarean section. Our study documented higher rates of LSCS compared to study conducted by Sriya R et al. In their study cesarean section for fetal distress was documented in 43.05% cases with AFI<5cm. While in control group with AFI>5cm, 12.5% patients had emergency cesarean section [18]. Similarly, In a study conducted by Jabeen S et al has also documented a higher possibility for cesarean emergency during fetal distress, 33.3% patients ended up in cesarean section having AFI<5cm [17]. Locatelli et al had showed that a very low incidence of 8.2% cesarean section rate in patients with, AFI<5cm while in control group with normal amniotic fluid index, 3.9% women ended up in cesarean section for fetal distress Morris JM et al has reported 26% incidence of cesarean with a fetal distress [15] Zhang J et al has reported 10% the relatively higher possibility for emergently cesarean on fetal distress in patients with AFI<5cm while in control group it was only 5 %. Results which are inconsistent

with our study because of difference in defining In our study fetal distress was diagnosed by the presence of meconium stain liquor and/or fetal heart rate abnormalities detected on intermittent auscultation. While in the reports diagnosis of fetal distress was based on continuous electronic fetal heart tracing and fetal scalp pH values. As facilities for fetal scalp pH were not available therefore our cesarean during fetal distress might be higher than above mentioned studies.[16]

Table 5. APGAR Score less than 7 at 5 min

Oligohydramnios group	<7 APGAR at 5 min
Syria et al	38.80%
Zhang et al	19.20%
Yousef et al	88.8%
Present study	78.80

In the study 31 (70.5%) newborns were admitted in neonatal intensive care unit in patients having AFI< 5cm while in control group 11 (2.5%) infants were admitted in Neonatal Intensive Care Unit (NICU). Similar to our study, Syria R et al has reported a very high incidence of NICU admission. In their study 88.88% infants were admitted in NICU in patients having AFI<5cm while in control group 52.8% newborns were admitted in NICU [17]. Casey BM et al in their study have reported 7% admission to the NICU in patients with AFI<5cm [18,19].

5. CONCLUSION

There is a high risk for oligohydramnios patients to give low-birth-weight infants, low Apgar scores

at 5 minutes, neonatal intensive care unit admissions, or perinatal death compared to pregnant women with Polyhydramnios.

CONSENT AND ETHICAL APPROVAL

The present prospective study was conducted after getting proper approval from the Institutional Ethics Committee (IEC) and Informed consent from the participants based on ICH/GCP guidelines.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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