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Clinical study on pregnancy outcome in amniotic fluid index (AFI) less than 5 cm in term low risk pregnancy

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Abstract

Introduction: Amniotic fluid is a clear, yellowish coloured fluid contained in amniotic sac which is in circulation around the fetus. It has numerous functions which are important for the fetus and its development in-utero. Amniotic fluid is regulated primarily by fetal swallowing and this has been observed as early in 16 weeks. The fluid gets absorbed through fetal gastrointestinal system and it either gets transferred to the maternal circulation or gets recycled back through the kidney. **Aims:** To study perinatal outcome in term oligohydramnios and to compare perinatal outcome in term oligohydramnios and in control groups. **Materials and Methods:** The present study was Prospective observational study. This Study was conducted in Nilratan Sircar Medical College and Hospital during 12 months span from January 2019 to January 2020. **Result:** It was found that 38.5% delivered vaginally and 59% underwent LSCS. Among the control group, 69.7% delivered vaginally and 23.8% delivered by LSCS. The p value is 0.02 and it is significant as it is less than 0.05. **Conclusion:** Determination of AFI is a valuable screening test for predicting fetal distress in labor requiring cesarean section. It has a sensitivity of 71% and negative predictive value of 82% specificity of 58% and positive predictive value of 43%.

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Keywords: Amniotic fluid index, Pregnancy outcome, Borderline and Pregnancy complication.

Introduction

Amniotic fluid is a clear, yellowish coloured fluid contained in amniotic sac which is in circulation around the fetus. It has numerous functions which are important for the fetus and its development in-utero.[1,2] Amniotic fluid is regulated primarily by fetal swallowing and this has been observed as early in 16 weeks. The fluid gets absorbed through fetal gastrointestinal system and it either gets transferred to the maternal circulation or gets recycled back through the kidney. Amniotic fluid volume, a perfectly regulated process is dependent on the respective gestational age, and it is maintained within a specific fixed range. The amniotic fluid peaks between 34-36 weeks of about 800-1000ml and therefore declines to about 400ml at 42 weeks. Amniotic fluid volume measuring less than 500 ml at 32 to 36 weeks of gestation is oligohydramnios. Amniotic fluid volume depends mainly on the gestational age; therefore, the best definition could be the one that is less than fifth percentile.

Oligohydramnios is defined by USG as an amniotic fluid index 5 cm or less or Single deepest pocket (SDP) of amniotic fluid value less than 2 cm is oligohydramnios. Incidence of oligohydramnios are varied from 0.5% to 5%.[3] There are no specific symptoms. Some of the pointers may be history of leaking per vaginum, post term pregnancy, preeclampsia, drugs and less perception of fetal movements. On clinical examination the uterus may be small for date i.e. smaller symphysis-fundal height and feels full of fetus because of scanty amniotic fluid. Oligohydramnios in third trimester is predominantly due to PROM.[3] As development of lung and limbs require adequate amniotic fluid. Oligohydramnios is found to be associated with lot of complications which include. Fetal Prematurity, abortion, IUFD, Potters syndrome, deformities (CTEV, contractures, amputation), malpresentations, fetal distress, meconium stained amniotic fluid, low APGAR, Cord compression and amnionnodosum.

So we have undertaken this study to assess and compare the perinatal and maternal outcome in term pregnancies with isolated oligohydramnios. This study will enrich the present knowledge and may enlighten us to frame the proper management of these cases bin future and thus may improve the perinatal outcome.

Antenatal test is done to evaluate fetus health and the risk of adverse outcomes during the course of a pregnancy. Amniotic fluid is an important part of pregnancy which plays a vital role in the normal growth of the fetus and, promotes muscular-skeletal development and allows for easier fetal movement.

Amniotic fluid assessment is an essential part of evaluation of fetus health in terms of fetal distress, meconium aspiration, caesarean and fetal mortality. The assessment of amniotic fluid volume is very crucial for the survival of the fetus and the Amniotic Fluid Index (AFI) is the most common way for the estimation of amniotic fluid volume which is performed by ultrasound method. Studies have revealed that AFI is an accurate criterion for estimating adequate placental function. Amniotic fluid volume varies with gestational age, rising to a plateau between 22-39

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weeks of gestation and reaching 700 and 800 ml, which correspond to an AFI of 14-15 cm.[4,5] Any decrease or increase in the volume of amniotic fluid leads to pregnancy complications.

In spite of different views on borderline AFI in different studies, there are, also, different views about its function and influence on maternal and fetal complications and medical care for fetus health. In most reported studies, the pregnancies with borderline AFI of 5-10 cm have shown outcomes such as non-reactive non-stress tests, fetal heart rate (FHR) deceleration, meconium aspiration, immediate caesarean delivery, low Apgar score, LBW, NICU admission and SGA in comparison with control subjects with normal amniotic fluid level (8.1-18 cm). Also the low amniotic index may increase the operative delivery rate.[6]

Also, according to Luo et al the pregnancy outcomes of a borderline versus normal AFI suggested no difference in the incidence of fetal distress or neonatal mortality, but the rate of caesarean delivery in borderline AFI was reported higher than the rate in normal cases.

Aims and Objectives :

Aim : Perinatal outcome in AFI less than 5 in term low risk pregnancy

Objectives :

1) To study perinatal outcome in term oligohydramnios

2) To compare perinatal outcome in term oligohydramnios and in control groups.

General Objectives:

To determine the perinatal outcome in AFI less than 5 in term low risk pregnancy.

Specific Objectives :

a) To compare the perinatal outcome in term oligohydramnios and in control groups.

b) To study fetal outcomes in term of fetal distress, NICU admission and APGAR score.

c) To study early neonatal morbidity and mortality.

d) To study maternal morbidity interms of operative delivery and induced labor.

Materials and Methods :

This study was done with the aim of see the maternal and fetal outcome in cases of oligohydramnios. The study was started after procuring Ethics Committee of NRSMCH approval. Proper informed consent was taken in written form from patient in her own language after explanation. It was conducted in Nilratan Sircar Medical College and Hospital, Kolkata, West Bengal, India during 12 months span from January 2019 to January 2020.

Study design/ Experiment design – Prospective observational study where patients were selected according to inclusion and exclusion criteria and feto- maternal outcome of oligohydramnios were recorded.

Place of study – The study was conducted in department of obstetrics and gynecology, Nilratan Sircar Medical College and Hospital, Kolkata, West Bengal, India

Study population – All antenatal women attending antenatal clinic of NRSMCH or mothers who are being admitted for some cause.

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Inclusion criteria –

AFI less than or equal to5

- Single, live intrauterine gestation with cephalic presentation.
- 37 completed weeks of gestation
- Intact membrane

Exclusion criteria-

AFI more than5

- Gestational age less than 37 completed weeks
- Post term
- Associated fetal malformation
- Ruptured membranes
- Malpresentation and multiple gestation
- High Risk pregnancies

Result:

Table 1 : Distribution of mode of delivery among study and control population

Mode of delivery	Study Group		Control Group		χ^2	p-value
	Frequency	**Percentage**	**Frequency**	**Percentage**		
Normal VD	30	38.5	85	69.7	25.302	0.002
LSCS	46	59.0	29	23.8		
Forceps delivery	2	2.6	8	6.6		
Total	78	100.0	122	100.0		

Table 1 shows the distribution of delivery among study and control groups. 38.5% delivered vaginally, 59% underwent LSCS and 2.6% were delivered by forceps among the study group. Among the control group, 69.7% delivered vaginally, 23.8% delivered by LSCS and 6.6% underwent forceps delivery. The p value is 0.02 and it is significant as it is less than 0.05.

Table 2 : Distribution of indication of LSCS among study and control population

Indication of LSCS	Study Group		Control Group		χ^2	p-value
	Frequency	**Percentage**	**Frequency**	**Percentage**		
FD	32	69.6	12	40.0	24.904	0.010
IUGR	12	26.1	2	6.7		
NPOL	1	2.2	6	20.0		
Other	1	2.2	10	33.3		
Total	46	100.0	30	100.0		

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Table 2 shows distribution of indication of lscs among study and control population. Among the study population 69.9% were operated with the indication of fetal distress, 25.1% underwent lscs due to iugr, 22.2% were operated with the indication of NPOL. Among the control population 40% were operated with the indication of fetal distress, 6.7% underwent lscs due to iugr, 20% were operated with the indication of NPOL. The p value is 0.01 which is below 0.05 which is significant.

Table 3 : Distribution of birth weight among study and control population.

Birth Weight	Study Group		Control Group		χ^2	p-value
	Frequency	Percentage	Frequency	Percentage		
<2.5	44	56.4	17	13.9	57.757	0.005
2.6-3	32	41.0	79	64.8		
>3	2	2.6	26	21.3		
Total	78	100.0	122	100.0		

Table 3 shows the distribution of birth weight among study and controlpopulation. Among the birth study population, 56.4% have low birth wt, 41% have birth weight between 2.6 to 3 Kgs and 2.6% has birth weight more than 3Kgs.Among the control population, 13.9% have low birth wt, 64.8% have weight between 2.6 to 3 Kgs and 21.3% has birth weight more than 3Kgs.

Table 4 : Distribution of APGAR score among study and control population.

AFGAR Score (1 minute)	Study Group		Control Group		χ^2	p-value
	Frequency	Percentage	Frequency	Percentage		
<7	34	43.6	9	7.4	12..821	0.025
>7	44	56.4	113	92.6		
Grand Total	78	100.0	122	100.0		
AFGAR Score (5 minute)						
<7	32	41.0	9	7.4	25.128	0.011
>7	46	59.0	113	92.6		
Grand Total	78	100.0	122	100.0		

Table 4 shows distribution of study and control population 43.6% among study group and 7.4% of the Control Group have APGAR score (1min) less than 7 and 41% of the study group and 7.4% of the Control Group have APGAR score 5 min less the 7.

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Table 5 : Distribution of admission to NICU and Neonatal death among study and control population.

Admission to NICU	Study Group		Control Group		χ^2	p-value
	Frequency	Percentage	Frequency	Percentage		
Yes	32	41.0	10	8.2	28.962	0.003
Neonatal Deaths						
Yes	2	2.6	0	0.0	0.000	0.98

Table 5 shows distribution of admission to NICU among study and control population 41% of the Study Group delivered babies who were admitted to NICU and 8.2% of the Control delivered babies who were admitted to NICU. The p- value < 0.05. The difference found to be significant. Only 2.6% of the study population has perinatal mortality

Discussion :

Oligohydramnios with AFI ≤ 5cm can lead to an increase in perinatal mortality and morbidity. Under these conditions, there is increased frequency of meconium stained liquor, fetal distress, low Apgar scores, abnormal fetal heart rates.

Here, we conducted study on 200 women who were >37 wks and were not known to have any high risk factors. Among them, 78 were cases and 122 were taken as controls.

We found that most of the cases (52%) and most of the control (56%) were in the age group of 21-25 years.

Our study showed that 56 of the cases (72%) and 73 of the controls (60%) were primi gravida. Thus most of the study populations were primi gravidas.

We observed that 24% of the study populations were 39 wks of gestation. 32% of the control populations were postdated.

It was found that most of our study population has AFI in the range of 3.1-3.9.

We examined that most of our control population has AFI in the range of 5-8.

Present study showed that 56.4% of the study groups have reactive NST and 43.6% have nonreactive NST. Whereas 89.3% of the control group has reactive NST and 10.7% have non-reactive NST. The p value is 0.01 which is less than 0.05, which makes it significant. Asavari et al (2014)[7] found that 35% of the study population had reactive NST and 65% had Non-Reactive NST.

Data of our study showed that among the study population 41% have clear liquor, 47.4% have thin meconium and 11.5% have thick meconium. Whereas among the control population 72.1% have clear meconium, 17.2% have thin meconium and 10.7% have thick meconium stained liquor. Jamal et al (2016)[8] found 17.2% of study populations have thick meconium stained liquor and 14.1% of the control population have clear liquor .18% of the cases having thick meconium

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stained liquor while only 8% of the control had thick meconium stained liquor. Sripreethika found 58.5% of mothers with oligohydramnios having thick meconium stained liquor. In this case our study results are similar to the study results of Jamal and Sangeetha.

We observed that among the study population, 11.4% have induced and 88.6% have spontaneous onset of labor. Among the control population, 41% have induced and 59% have spontaneous onset of labor. The p value is 0.05 which is significant. Kolosum found 42% cases to be induced and 12.6% of the control to be induced. Here the study results is not similar due to small sample size.

It was found that 38.5% delivered vaginally and 59% underwent LSCS. Among the control group, 69.7% delivered vaginally and 23.8% delivered by LSCS. The p value is 0.02 and it is significant as it is less than 0.05. Jamal found 59.4% to deliver vaginally and 40.6% to be delivered by LSCS. Here the study results is not similar due to small sample size.

We examined that among the study population 69.9% were operated with the indication of fetal distress and among the control population 40% were operated with the indication of fetal distress. The p value is 0.01 which is below 0.05 which is significant. Kolosum 8.9% underwent LSCS due to fetal distress. Asavari found that 53% of the study group delivered by LSCS under the indication of fetal distress while 24% of the control group delivered by LSCS under the indication of fetal distress. Our study result in this regards is similar to the one conducted by Asavari.

In the study population 43% of the cases and 7.4% of the controls have APGAR score of <7 1 min after birth which makes the p value 0.02 which is significant. In the study population 41% of the cases and 7.4% of the controls have APGAR score of <7 5 min after birth which makes the p value 0.01 which is significant. Kolosum found 4.7% of the cases have APGAR score below 7 while Sripreethika found 18% of the cases have APGAR score. Here the study results is not similar due to small sample size.

We found that among the study population, 56.4% have low birth wt and among the control population, 13.9% have low birth wt. Sripreethika[9] found 8% of the cases having low birth wt babies. Here the study result is not similar due to small sample size.

Present study:

In this study outcome of 78 patients with AFI ≤ 5cm was compared with 122 patients with AFI > 5cm. In study group, 30 patients had normal vaginal delivery and 46 patients underwent LSCS and 2 patient underwent forceps delivery. In control group, 85 patients had normal vaginal delivery, and 29 patients underwent caesarean section, 8 patients forceps delivery.

Conclusion

- An amniotic fluid index of < 5 cm detected after 37 completed weeks of gestation is an indicator of poor perinataloutcome.
- In presence of oligohydramnios, the occurrence of non reactive NST, abnormal FHR tracings during labor, thick meconium stained, liquor, development of fetal distress, the

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rate of LSCS, low 5 minute Apgar score, low birth weight and perinatal mortality are high. (In our study the rate of LSCS, low 5 min Apgar score and perinatal mortality number is high but statistically the difference in study and control groups are nonsignificant.)

- Determination of AFI can be used as an adjunct to other fetal surveillance methods. It helps to identify those infants at risk of poor perinataloutcome.
- Determination of AFI is a valuable screening test for predicting fetal distress in labor requiring cesarean section. It has a sensitivity of 71% and negative predictive value of 82% specificity of 58% and positive predictive value of 43%.

References

1. A Underwood, Mark and M Gilbert, William and Sherman, Michael. Amniotic Fluid: Not Just Fetal Urine Anymore. J Perinatol official journal of the California Perinatal Association. 2005;25:341-8.
2. Physiology of amniotic fluid volume regulation. Brace RA Clin Obstet Gynecol. 1997;40(2):280.
3. Van Reempts P, Kegelaers B, Van Dam K, Van Overmeire B. Neonatal outcome after very prolonged rupture of membranes. Am J Perinatol. 1993;10:288-91.
4. Magann EF, Chauhan SP, Bofill JA, Martin JN Jr. Comparability of the amniotic fluid index and single deepest pocket measurements in clinical practice. Aust N Z J Obstet Gynaecol. 2003;43:75–77. [PubMed] [Google Scholar] [Ref list]
5. Anderson D, Yang Q, Hohimer A, Faber J, Gi Raud G, Davi SL. Intramembranous absorption rate is unaffected by changes in amniotic fluid composition. Am J Physiol Renal Physiol. 2005;288:964–968. [PubMed] [Google Scholar] [Ref list]
6. Karim R, Jabeen S, Pervaiz F, Wahab S, Yasmeen S, Raees M. Decreased amniotic fluid index and adverse pregnancy outcome at term. JPMI. 2010;4:307–311. [Google Scholar] [Ref list]
7. Bachhav, Asavari Ashok, and ManjushriWaikar. "Low amniotic fluid index at term as a predictor of adverse perinatal outcome." Journal of obstetrics and gynaecology of India vol. 64,2 (2014): 120-3. doi:10.1007/s13224-013-0489-9
8. Jamal A, Kazemi M, Marsoosi V, Eslamian L. Adverse perinatal outcomes in borderline amniotic fluid index. Int J Reprod Biomed (Yazd). 2016;14(11):705-708.
9. Rajavelu S, Dayalan V, Surya S. A study on maternal and perinatal outcome of oligohydramnios in term low risk pregnancy. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2019 Nov 1;8(11):4346-50.