Original Research Article

Observing Effects in Perinatal and Maternal Outcomes of Term Oligohydramnios Patients.

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Abstract:

Introduction: Nature has made floating bed in the form of amniotic fluid cavity filled with liquor amnii for the requirement of fetus, for its existence and growth in sterile environment. Levels of amniotic fluids affects 2.4% of pregnancies. Early onset oligohydramnios has been associated with fetal congenital anomalies and poor fetal outcome.

Hence this study was designed to observe effects of oligohydramnios in perinatal and post-natal phases and their outcomes

Methodology: The present study was carried out in the department of obstetrics and gynecology at tertiary care institute of Madhya Pradesh over a period of one. In this hospital-based study a total of 227 patients of gestational age >37 weeks and ≤40 weeks were involved with 27 drop-outs. Hence finally 200 patients were selected for this study of which 100 had an AFI ≤5 and were included in the study group and 100 had an AFI>5.

Results: Results of present studies shows Birth weight in Group1 out of 100 cases whom AFI >5cm; 24(24%) babies weighed <2.5 kg whereas majority i.e. 76(76%) weighed ≥2.5kg.

In Group2 out of 100 cases in whom AFI was ≤5 more babies i.e. 51(51%) were <2.5kg i.e. 49(49%) were ≥2.5kg. So L.B.W. of babies were more often associated with AFI≤5 i.e.51% as compared to AFI>5cm which is 24%. The p value statistically significant.

Out of 200 women studied NICU admission were required in 38(19%) cases, in the Group 2 i.e. AFI ≤5 required i.e. 29(29%) as against 9(9%) of Group1 with AFI >5, therefore neonates of women complicated with Group2 are more likely to require NICU admission.

Conclusion: Antepartum oligohydramnios was associated with increased perinatal morbidity, low birth weight, NICU admissions and increase rate of CS. Early intervention like induction of labour, close intrapartum monitoring etc., to be taken as prevention. It signifies need for prevention, early detection and timely intervention to prevent complications.

Keywords: Perinatal, Maternal, Outcome, Oligohydramnios.

Introduction

Nature has made floating bed in the form of amniotic fluid cavity filled with liquor amnii for the requirement of fetus, for its existence and growth in sterile environment, regulation of temperature, avoidance of external injury and reduction of impact of uterine contractions. Decrease in amniotic fluid volume or oligohydramnios has been correlated with increased risk of intrauterine growth retardation, meconium aspiration syndrome, severe birth asphyxia, low APGAR scores and congenital abnormalities. Oligohydramnios is also associated with maternal morbidity in form of increased rates of induction and operative interference.

Oligohydramnios is a clinical condition which is characterized by Amniotic fluid below 200cc or AFI ≤ 5 cm or on a single deepest pocket of amniotic fluid ≤ 2cm. The diagnosis also may be based on an AFI below the 5th or 2.5th percentile determined by a gestational –age –specific nomogram or may be based on subjective assessment of decreased amniotic fluid volume. In the Moore nomogram, a threshold of 5 cm is below the 2.5th percentile throughout the 2nd and 3rd

trimester [1]. While evaluating twin pregnancies for twin-twin transfusion syndrome, a single deepest pocket ≤ 2cm is used to define oligohydramnios.

Amniotic fluid provides a protected environment for the growing fetus, cushioning the fetus against mechanical and biological injury, supplying nutrients and facilitating growth and movement. It affects 2.4% of pregnancies between 36 to 40 weeks [2,3] and 12% of pregnancies at 41 weeks or later [4]. Early onset oligohydramnios has been associated with fetal congenital anomalies and poor fetal outcome[5].According to some author [6-9] oligohydramnios in 3rd trimester may be responsible for malpresentation, umbilical cord compression and thick meconium stained liquor. Several study has shown association of oligohydramnios with an increase caesarian delivery rate [10],an increase in non-re-assuring fetal heart rate with adverse perinatal outcome [11] and lower apgar scores [12].

1. The Amnion and chorion are combined to form a hydrostatic wedge which helps in dilatation of the cervix.
2. During uterine contraction, it prevents marked interference with the placental circulation as long as the membranes remain intact.

It flushes the birth canal at the end of first stage of labour by its aseptic and bactericidal action. Hence protects the fetus and prevents ascending infection to the uterine cavity. Fetus swallows' amniotic fluid equivalent to 20-25% of body weight [13].

Oligohydramnios is a clinical entity characterized by Amniotic Fluid Index (AFI) of 5 cm or less. In general, oligohydramnios developing early in pregnancy is less common and frequently has a bad prognosis. Diminished fluid volume may be found often with pregnancies that continue beyond term [14].

India is a developing country where; a large number of women don't have ANC visits and turn up in hospital only for delivery and may land up with oligohydramnios giving birth to low-birth-weight babies (LBW) or low apgar score babies. So, it is very necessary to educate woman in India about the importance of ANC visits in the third trimester to reduce perinatal and maternal morbidity and mortality rate. Amniotic fluid highly influences the fetal outcome. Hence, this study aims to analyse how the fetal outcome is affected by the various grades of oligohydramnios, so that appropriate and timely intervention can be taken to reduce the adverse outcome. Doppler velocimetry of umblical artery is an effective method of identifying fetuses at risk by measuring s/d ratio, PI & RI.

Hence we have undertaken this study to observe effects of oligohydramnios in perinatal and post-natal phases and their outcomes.

Materials and Methods:

The present study was carried out in the department of obstetrics and gynecology at tertiary care institute over a period of one year from January 2022 to December 2022. In this hospital-based study a total of 227 patients of gestational age >37 weeks and ≤40 weeks were involved of which 27 patients denied for participating the study or were the drop outs. Hence finally a sum of 200 patients were selected for this study of which 100 had an AFI ≤5 and were included in the study group and 100 had an AFI>5 and allocated to the control group.

Inclusion Criteria

1. AFI less than or equal to 5(for study group).
2. Single live intrauterine gestation with cephalic presentation.
3. 37-40 weeks of gestation.
4. Intact membrane.

Exclusion Criteria

1. Patients with rupture of amniotic membranes.
2. Patients with foetus having congenital anomalies.
3. Multiple gestation.
4. Gestational age<37 week or >40 weeks.
5. High risk pregnancy e.g.
a. Placental insufficiency: Chronic hypertension, pre-eclampsia, diabetes, hypovolemia, chronic renal disease, connective. tissue disorders.
b. Abruption.
c. Prostaglandin synthetase inhibitors therapy.
d. Angiotensinogen converting enzyme inhibitors therapy.

Protocol:

All the antenatal patients satisfying the inclusion criteria, after taking written informed consent from all the patients, attending the out patients department and labour room, whether booked or unbooked, with the gestational age 37-40 weeks, with singleton pregnancy with well-established dates were subjected to a routine ultrasound examination. Women with unsure dates were excluded. AFI was measured by using the technique described by Phelan et al. A curvilinear transducer was used. By marking, the uterus was divided into four quadrants using the maternal sagittal plane vertically and an arbitrary transverse line approximately halfway between the symphysis pubis and upper edge of uterine fundus. The transducer was kept parallel to the maternal sagittal plane and perpendicular to the maternal coronal plane throughout. The deepest, unobstructed and clear pocket of amniotic fluid was visualized and

the image was frozen. The ultrasound calipers were manipulated in such a way to measure the pocket in a strictly vertical direction. The process was repeated in each of the four quadrants and pocket measurements were summed up to give the AFI. Patients then grouped according to their AFI. 100 patients with AFI≤5 were allocated to the study group and 100 patients with AFI>5 were taken as controls. Careful history, thorough physical examination and baseline investigations were collected and recorded in a pre-designed proforma by taking the important variables for the objective of study.

On admission, non-stress test (NST) was done for all the women in both the study and control groups. If NST was not reassuring, emergency caesarian section was done. If NST was reassuring, further management was decided, based on whether the patient was in labour or not. If patient was not in labour, she was induced with prostaglandin gel E2 (Dinoprostone gel) intravaginally. A maximum of 2 doses of Dinoprostone gel were used minimum 6 hrs. apart for induction if needed. Once the patient went into active labour, if required artificial rupture of membranes (ARM) was done at 4 cm dilation and color of the liquor was observed in selected cases. Partogram was plotted to know the progress of labour. All cases were monitored by auscultating FHS at every 15 mins. Oxytocin drip was started if contractions were weak after checking FHR. If there were late deaccelerations, persistent bradycardia and persistent tachycardia and there was evidence of foetal distress such as meconium-stained liquor, the delivery was expeditated by operative intervention. All newborns were attended by the pediatrician. The birth weight and Apgar score at 1 ($<$6) and 5 minute ($<$7) were noted and considered as satisfactory. If the Apgar score was low or the baby has respiratory distress, the baby was admitted to neonatal intensive care unit (NICU). The various outcomes recorded were NST, induced or spontaneous labour, color of the liquor, mode of delivery, Apgar score, NICU admission, need for the ventilatory support and perinatal deaths.

Results:

In the present study, a total of 200 woman who had fulfilled the inclusion criteria were selected, studied and follow up was done. The study group consisted of Group1 women with AFI >5cm and Group2 women with AFI≤5cm.

Table-1: Case Distribution according to AFI

S. No	AFI	No. of patients	percentage
1.	>5	100	50
2.	≤5	100	50

Table-2: Demographic data of the patients involved

S.NO	Age	No of patient group 1(%)	No of patient group 2(%)	Total
Case distribution according to age				
1	<20	13(13%)	14(14%)	27
2	21-25	34(34%)	35(35%)	69
3	26-30	36(36%)	36(36%)	72
4	>30	17(17%)	15(15%)	32
Parity distribution in study group				
	Parity	**group1no (%)**	**group2 no (%)**	**Total**
	G1	58(58%)	52(53.33)	110
	G2	27(27%)	25(25%)	52
	G3	11(11%)	16(16%)	27
	G4 and above	04(4%)	07(7%)	11

Table -2 showing distribution of cases according to age groups. Both the groups were comparable. Maximum women 59% were in the 21-25years age group i.e. In Group1 60% and in Group2 58%. Mean age in the study Group1 was 24.45 years and Group2 was 24.71 years.

p value was 0.459341 which is insignificant. Parity wise distribution of cases in the two groups is comparable. However, maximum women 110(55%) were Primi gravidas i.e. 58(58%) in Group1 and 52(52%) in Group 2. There were 52(26%) gravida 2, 27 were (13.5%) gravida 3 and only 11(5.5%) were gravida 4 and above. P value is 0.542203 which is insignificant.

Table 3: Complications and post-natal effects amongst study groups

IUGR Babies in study group		
Study Group	**IUGR Babies no (%)**	**Total**
Group1	8(8%)	100
Group2	21(21%)	100
Obstetrical Complication in study group		
Study Group	**PIH Patient**	**Total**
Group1	7	100
Group2	15	100
Comparison of birth weight in the study group		
AFI	**No. of patients with <2.5kg weight (%)**	**No. of patients with ≥2.5 kg weight (%)**
Group1	24(24%)	76(76%)
Group2	51(51%)	49(49%)
Admission in NICU		
Study group	**Admission in NICU**	Percentage
Group1	9	9%
Group2	29	29%
Mode of delivery in study Group		
Study group	**Vaginal delivery (%)**	**CS (%)**
Group1	63(63%)	37(37%)
Group2	34(34%)	66 (66%)

Table-3 showing that greater no. of IUGR babies were in Group2 i.e. 21(21%) out of 100 and 8(8%) IUGR babies were found in Group1 out of 100. However the difference between the two groups was statistically insignificant (p value= 0.296259).

(AGA=Appropriate for Gestational age)

Present table showing Birth weight observed in the study groups. In Group1 out of 100 cases whom AFI >5cm; 24(24%) babies weighed <2.5 kg whereas majority i.e. 76(76%) babies weighed ≥ 2.5kg.

In Group2 out of 100 cases in whom AFI was ≤5 more babies i.e. 51(51%) were <2.5kg whereas lesser no. i.e. 49(49%) were ≥2.5kg. So L.B.W. of babies were more often associated with AFI≤5 i.e.51% as compared to AFI>5cm which is 24%.The p value was 0.021103 which was statistically significant.

Out of 200 women studied NICU admission were required in 38(19%) cases, however greater number of neonates in the Group 2 i.e. AFI ≤5 required admission to NICU i.e. 29(29%) as against 9(9%) of Group1 with AFI >5, therefore neonates of women complicated with Group2 are more likely to require NICU admission. The difference thus observed was statistically significant (p value =0.014583).

Present table showing no. of PIH patients in Group1 were 7% and in Group2 no. of PIH patients were 15%. p value was 0.4058 which is insignificant.

CS was more often required in 66(66%) in Group2 i.e. AFI<5cm group as compared to 37(37%) CS in Group1 and the difference so observed was statistically significant. (p value=0.0427)

Table 4: Indication for LSCS amongst study group population

S No	Study group	IUGR	Fetal distress	Failed induction	Total (%)
1	Group 1 N=100	8(8%)	12(12%)	17(17%)	37
2	Group 2 N=100	21(21%)	35(35%)	10(10%)	66

Table-4 showing that rate of CS for fetal distress in Group1 was 12% as compared to 35% in Group2. The rate of CS for IUGR Group1 was 8% as compared to 21% in Group2, 17% patients undergone CS for Failed induction in Group1 and 10% patients in Group2.

Hence greater no. of women had CS for fetal distress in Group2 as compared to Group1 the

difference was statistically significant.(P value=0.010429)

Out of total 19 (8.5%) neonates out of 200(100%) had 5 min APGAR score <7. But on comparing the two groups only 6(6%) neonate of Group1 i.e. AFI>5cm had APGAR <7at 5min, whereas more neonates 13(13%)of Group2 i.e. AFI ≤5 had APGAR <7 and required transfer to NICU. The difference in the rate of low APGAR score between

the two study groups was statistically insignificant (P value=0.461192).

Table 5: Birth weight and APGAR score

S No	Birth weight	APGAR Score		Total
		>7 no (%)	<7 no (%)	
1	<2.5kg	61(81.33%)	14 (18.67%)	75
2	≥2.5kg	120(96%)	5(4%)	125

Table-4 showing that all 14(18.67%) babies who had 5 APGAR Score <7 were also having birth weight <2.5 whereas out of 125 babies weighing≥2.5kg only 5(4%) had APGAR <7 at 5.

Discussion

A total of 200 woman who fulfilled the inclusion criteria were included in this study. On the basis of AFI they were divided in to Group1 (100 women with AFI>5). and Group2(100 women with AFI≤5cm). Present study was conducted to compare the maternal and perinatal outcome in the two groups. Both the groups were similar with regards to antepartum variable i.e. maternal age, parity and gestational age with p values not significant like in the study by Purvi K. patel et al and Nirmala shivalingaiah et al.

Maximum no. of cases were found in the age group 21-25 years i.e. 59%, with a mean age of 24.45 years in Group1 and 24.71years in Groups2.This match with mean age of study group quoted by Nirmala shivalingaiah et al (24.6yr) Sharma Sujata et al. [15, 16]

Majority of women were primigravida in both groups(Group1- 58% and Group2 -52%) as in study done by Purvi K patel et al, sharma sujata et al and Nirmala shivalingaih et al. [15-17]

Rate of CS was more in Group2 is 66% as compared to Group1 37% with statistically significant difference p value=0.0427. Our finding correlates with Sujata Sharma et al quote CS rate of 67.5% in cases with AFI <5. Nirmala shivalingaish et al quote 74% CS in Group with AFI <5.

Greater no. of CS was done for fetal distress in Group2 (AFI≤5) i.e. 35% as compared to Group1 (AFI>5) i.e.12%. The difference was significant statistically (p value=0.010429). Greater no. of IUGR babies were in Group2 i.e. 21(21%) and 8(8%) IUGR babies were found in Group1.However the difference between the two groups was statistically insignificant (p value=0.296259) Our results correlate with Baron and coworkers. They showed that the sensitivity of oligohydramnios as a predictor of caesarean delivery for fetal distress was 78% and the specificity 74%. Fifty percent of the operative interventions were due to intrapartum fetal distress and another 26.47% due to IUGR with doppler changes showing fetal jeopardy.

More woman in Group2 (AFI≤5) had LBW babies (<2.5kg) 51% as compared to Group1 (AFI >5) 24%, the difference being statistically significant (p value=0.021103) which is similar to the finding of Sharma sujata et al who also quote high incidence of LBW babies i.e. 57.6% in women with similar finding of higher incidence of IUGR in cases with AFI≤5 as compared to cases with AFI>5. Purvi k patel et al observed no statistically significant difference in number of IUGR babies amongst the two groups. [18]

In our study, a statistically significant difference was found in the rate of meconium staining of liquor in two groups- 29% in Group2 (AFI<5) as compared to 7% in Group1 (AFI>5) with p value=0.003768.Rate of NICU admission in the two groups , 29% in Group2 as compared to 9% in Group1 (p value=0.014583) and no significant difference in the 5 minute APGAR score <7 which was 13% in Group2 and 6% in Group1 (p value=0.4611). However greater no. of babies in Group2 had APGAR at 5 min <7 similar to our finding Nirmala shivalingaiah et al noted high incidence of meconium-stained amniotic fluid in woman with AFI<5 cm i.e. 26%. Rate of NICU admission in oligohydramnios group was 78% and low APGAR at one minute was found in 54% cases of AFI<5. [15]

Casey et al reported an NICU admission rate of 7% in patients with oligohydramnios. However, Purvi K. Patel et al reported increased incidence of meconium stained amniotic fluid in AFI<5 group in comparison to AFI> 5 group, which was statistically significant but they reported no significant difference in rate of NICU admission 20.0% in cases against 18.75% in controls as well as rate of 5 minute APGAR Score < 7 20.0% in cases against 16.88% controls.[18]

In our study we reported 1 baby needed ventilatory support in group2 (AFI≤5) and no baby in group1 (AFI>5) needed ventilatory support. In Group2, 1 perinatal death was observed and no death was observed in Group1.The difference so observed was not statistically significant. Our findings correlate with findings of Elizabeth G. who also observed one fetal death in group with AFI<5. [19]

Summary:

The goal of antepartum fetal surveillance is to identify the fetus at risk, as amniotic fluid volume has been proved an indirect measure of feto-

placental function. Hence the estimation of amniotic fluid index assists the obstetrician in risk assessment. In various semi quantitative methods described, four quadrant technique for AFI provides most convenient and reproducible method of evaluating amniotic fluid volume.

In our study there was increased incidence of induction of labour in the group with AFI ≤5 as compared to control group. The rate of CS in the group with AFI ≤5 was much higher than control group. Greater no. of women had LBW babies (<2.5kg) in the group with AFI<5 as compared with the group with AFI in normal limit.

The rate of meconium staining of liquor and rate of NICU admissions were more in the group with AFI≤5 than the group with AFI>5. 5 min APGAR score <7 was found more often in Group2 (13%) as compared to Group1 (6%) however this difference between apgar scores was not found to be significant in our study.

There was only one perinatal mortality in the study group and no mortality in the control group.

Conclusion

antepartum oligohydramnios was associated with increased perinatal morbidity in terms of meconium aspiration, low birth weight, NICU admissions in our institution but not associated with increased mortality. Maternal morbidity increases in the form of increase rate of induction and CS.

Early intervention in the form of induction of labour, close intrapartum monitoring, artificial rupture of membranes in active phase of labour and grading of liquor and early decision making regarding mode of delivery are the steps to be taken to prevent poor perinatal outcome. Immediately after birth, proper resuscitation by a paediatrician is mandatory.

In a nutshell oligohydramnios i.e, AFI<5cm measured by USG in term pregnancies is associated with adverse perinatal outcome. It signifies the need for prevention, early detection and timely intervention to prevent the associated complications.

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