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Original Research Article

Study of mode of delivery and fetal outcome in pregnancies with oligohydramnios

Lavanya B., A. Prajwala*

Department of Department of Obstetrics and Gynaecology, Navodaya Medical College Hospital and Research Centre, Raichur, Karnataka, India

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***Correspondence:**
Dr. Prajwala A.,
E-mail: prajwala.2209@gmail.com

ABSTRACT

Background: The significance of amniotic fluid volume as a marker of fetal status is an ongoing turn of events. Oligohydramnios causes adverse fetal outcomes like meconium-stained liquor, meconium aspiration syndrome, fetal heart rate abnormalities, poor APGAR scores, fetal growth restriction and fetal prematurity. It is associated with maternal hypertension, infections, and placental insufficiency. It causes maternal complication because of increased incidence of induction of labour and operative intervention.
Methods: Hundred cases of oligohydramnios were included in our study conducted at the Navodaya medical research, hospital and research centre, during a period of two years after obtaining the informed consent of patients and institutional ethical clearance. All gravidas were included with a gestational age greater than 28 weeks with singleton pregnancies with oligohydramnios. Associated fetal and maternal risk factors were observed. The amniotic fluid index (AFI) was measured by ultrasound. The nonstress test, the fetal biophysical profile and the Doppler study were carried out to evaluate the fetal condition. Then we have observed for delivery and fetal outcome.
Results: Incidence of oligohydramnios was 2.85% in our study. The 53% of cases had LSCS while 47% had normal delivery. Fetal distress was the commonest indication for LSCS. Poor neonatal APGAR score was 16.9% in LSCS while 36% in vaginal delivery.
Conclusions: From the above study, the caesarean delivery seems to be a safer mode of delivery than vaginal delivery because it is associated with a good perinatal outcome.

Keywords: Oligohydramnios, Fetal outcome, Mode of delivery, Vaginal delivery, Caesarean section

INTRODUCTION

Water world

It's interesting to note that we all started as aquatic creatures. It is a romantic notion that as our ancestors came from the ocean to live life on earth. We are also looking for land through this right of passage called birth. Until then, we float in an amniotic fluid, which gives temperature stability, cushioning and a necessary presence in the collapsed respiratory tracts to help stimulate pulmonary development.

Oligohydramnios can be defined as an AFI below the 5th percentile for gestational age or AFI less than or equal to 5 cm, without any regard to their gestational age. It is classified as mild, moderate and severe oligohydramnios when the deepest pocket devoid of cord/fetal limbs measuring <3, 2 or 1 cm, respectively.[1] It complicates 1-5% of term pregnancies with an incidence of 3.9% among all pregnancies.

Oligo hydramnios was defined as AFI<5th percentile for gestational age by Moore and Cayle, AFI< 5.0 cm by Phelan et al, AFI< 8.0 cm Jeng et al at term the 5th

percentile, that is an AFI between 7.1-9.7 cm was suggested to be a cut off for the detection of oligohydramnios.[2-5]

Manning et al defined oligohydramnios when largest pocket on ultrasound in its widest diameter measuring <1 cm. After that the criteria were revised to a single pocket measuring 2 cm in both planes that is vertical/ horizontal.[6]

single deepest pocket remains as the methodology to estimate amniotic fluid volume along with another component of BPP.[7]

It is determined that oligohydramnios is associated with a higher frequency of maternal and fetal complications.[8]

It is believed that oligohydramnios, in a pregnancy without fetal renal abnormality or genitourinary obstruction represents chronic in utero stress which could have significant impact on maternal and fetal outcome.[9]

By diagnosing such cases, early and timely intervention can prevent most of the complications. This clinical study was conducted on 100 cases of oligohydramnios to know their mode of delivery and perinatal outcome.

METHODS

Our study is a prospective cohort study done in Navodaya medical college hospital and research centre, Raichur during the period January 2019 to December 2020 comprising of 100 patients with oligohydramnios being diagnosed after 28 weeks of gestation, admitted from outpatient and also on emergency basis, both booked/ unbooked, who were willing to cooperate were chosen.

Inclusion criteria

All gravidas with oligohydramnios (AFI<5 cm), gestational age greater than 28 weeks, patient with intact membranes, associated maternal and fetal complications (like gestational hypertension, intrauterine growth restriction (IUGR), fetal distress), fetal congenital anomalies, Singleton pregnancies in cephalic presentation, post-dated pregnancies were included study.

Exclusion criteria

Patients with less than 28 weeks period of gestation, premature rupture of membranes, intra-uterine death of fetus, multiple pregnancy, malpresentation at 36 weeks, previous caesarean section, maternal history of drug intake (Such as indomethacin, ACE inhibitors) were excluded from the study.

Procedure

A detailed analysis was carried out with respect to age, parity, booking status, the patient's clinical history. Both preliminary and specific investigations were carried out, including ultra-sound with a biophysical profile, doppler flow studies were done. Antepartum surveillance was done. Intra-partum monitoring was done clinically and with cardiotocography. Mode of delivery was noted and if LSCS done, indications for the same noted. Baby APGAR was noted and if there was any neonatal intensive care unit admission, indication was noted according to the paediatrician diagnosis and the admitted babies were followed to note the outcome.

Ethical approval

Approval and clearance from the institutional ethics committee was obtained.

Statistical analysis

Statistical analysis was carried out using SPSS ver 24. Data was analysed by descriptive statistics, For the test of significance student unpaired ‘t’ test and chi square test to see the significant difference between two groups p less than 0.05 were considered.

RESULTS

Incidence of oligohydramnios

The total number of deliveries at Navodaya medical college hospital and research centre, Raichur, Karnataka during the period of study were 5468 of which 156 cases are oligohydramnios accounting for 2.85%.

Gestational age at presentation

In our study, 40 cases were in the group 38-40 weeks of gestation, 33 cases were in 35-37 weeks of gestation, 19 cases were in 32-34 weeks of gestation, 8 cases were in 41-42 weeks of gestation.

AFI at admission

In our study a larger number of the cases (53%) were in AFI 2.1-4 group, followed by 30% in the group of AFI-4.1-5 and 17% in group of AFI of 0-2.

Maternal and fetal complications associated with oligohydramnios

It is evident from our study, that majority of the patients with oligohydramnios are associated with risk factors like PIH, IUGR. Incidence off PIH is 24%. Incidence of IUGR is 15%. Incidence of PIH associated with IUGR is 26%.

USG doppler velocimetry

Doppler was considered as abnormal when umbilical artery pulsatility index is >1, resistance index is >0.65, systolic / diastolic ratio is >3.

Abnormal Doppler velocimetry was noted in 43 cases.

Among them in the group AFI 0-2 accounting to 64.71% of cases. Therefore, it was observed that with the increase of severe oligohydramnios, the occurrence of doppler being abnormal also increased.

Bio physical profile

It is evident from the above Figure 1 that in the group 0-2, majority accounting for 76% had BPP 6/8. In group 2-4, 62% had BPP 7/8 and in group 4-5, 73% had BPP 8/8. This concludes that BPP is better with good AFI.

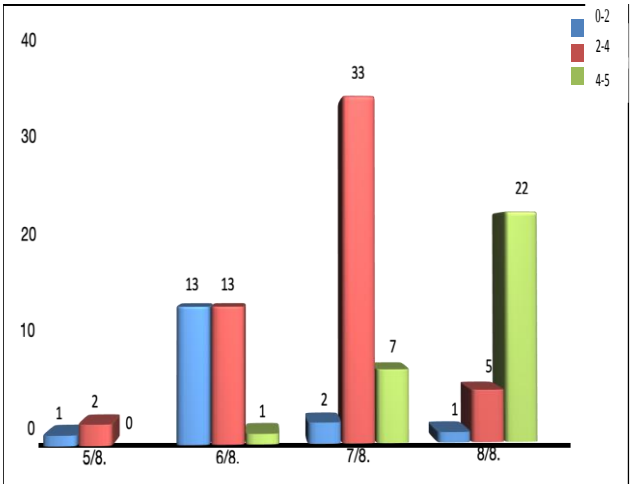

Figure 1: Biophysical profile.

Mode of delivery

Table 1: Mode of delivery.

AFI	Caesarean section	Vaginal delivery
0-2	12	5
2-4	27	26
4-5	14	16
Total	53	47

From above Table 1, it is evident that 53 patients were delivered by caesarean section, 47 patients delivered vaginally. Five patients among 0-2 AFI group, who were preterm with severe IUGR, were allowed for vaginal delivery in view of low chances of survival, out of which 3 cases, eventually led to still births.

Indications for caesarean section

Fetal distress was indication for about 27 cases out of 53 cases i.e., about 51%.

PIH is the indication for 11 out of 53 cases accounting to 21%. Most of the cases with fetal distress had come in labour for which emergency caesarean delivery is performed and meconium-stained liquor was observed during the delivery.

Amniotic fluid appearance

Liquor was meconium stained in 41% of cases. About 9 cases (53%) in the AFI 0-2 group showed meconium-stained liquor. And the remaining 8 cases (47%) had clear liquor. The other two groups, had a near equal incidence of meconium-stained liquor at about 37.8% and 40% respectively.

Meconium-stained liquor-mode of delivery

Table 2: Meconium-stained liquor-mode of delivery.

AFI	MSL in caesarean section	MSL in vaginal deliver-IES
0-2	6	4
2-4	11	8
4-5	8	5
Total	24	17

Table 2 shows about 24 cases came in labour (with intact membranes) with abnormal fetal heart rate pattern and they underwent caesarean delivery. Meconium-stained liquor was observed during the delivery.

Perinatal outcome in oligohydramnios

Table 3: Perinatal outcome in oligohydramnios.

AFI	≥8/10	7/10, 6/10	<6/10	Total
0-2	6	8	3	17
2.1-4	16	17	20	53
4.1-5	17	10	3	30
Total	39	34	27	100

About 39% of babies had good APGAR score of 8/10 at 5 min after birth. While 61% of babies had APGAR score <8/10. In the group AFI 0-2, 11 cases accounting to 64.7% had APGAR score <8 which shown in Table 3.

Correlation between mode of delivery and APGAR score

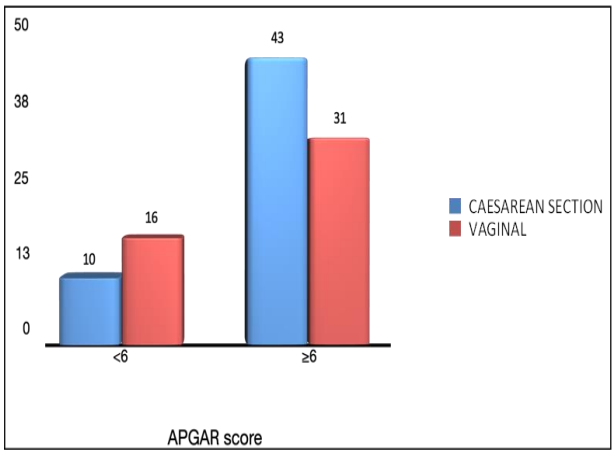

Figure 2: Correlation between mode of delivery and APGAR score.

Figure 2 depicts in 53 cases of caesarean section, 44 babies i.e., about 83% of babies had good APGAR score ≥6 and only 9 babies (16.9%) had APGAR score <6.

In 47 cases of vaginal deliveries, 30 babies i.e., about 64% of babies had good APGAR score ≥6 ($p<0.05$) and 17 babies (36%) had APGAR score <6.

Birth weight

It is evident that almost half (48%) of the patients in our study had low birth weight babies and 8% of patients had very low birth weight babies.

Neonatal intensive care unit admissions

About 45 babies (45%) were admitted into neonatal intensive care unit. Among which 56% of babies were low birthweight and 15% of babies were having IUGR. In AFI 0-2 group out of 17 babies, 3 babies were still born and 10 babies needed neonatal intensive care unit admission.

Perinatal outcome

IUGR was seen in 15 cases and preterm delivery in 43 cases, still births in 10 cases and PIH with IUGR in 26 cases. As the incidence of preterm delivery is high, the maternal and fetal complications associated with oligohydramnios are also high, thus causing many of the cases being terminated before term in view of fetal and maternal interests.

Two cases had congenital anomalies. One had Omphalocele, other baby had polycystic kidney disease which does not have statistical significance.

Perinatal mortality

Total still births were 10 and number of deaths <7 days were 2 babies. The perinatal mortality in our study is 12%.

DISCUSSION

Due to increase in use of ultrasonography in the prenatal period, greater number of oligohydramnios complicating pregnancy are being detected.

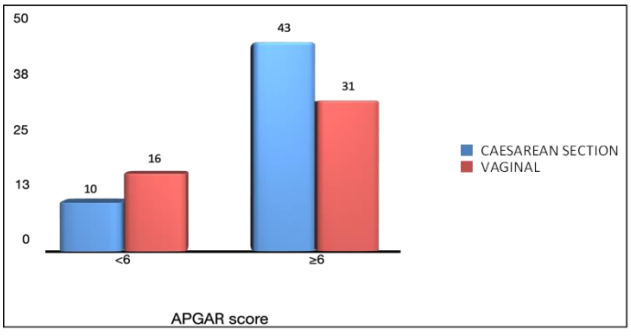

Figure 3: Apgar score.

The results of this present study are compared with other studies.

Figure 3 shows incidence in present study is more compared with Casey et al study and Zhang et al study.[10,13]

Gestational age

Maximal number of patients (40%) belonged to gestational age group of 38-40 weeks. According to Thomas et al study most of the cases were between 38±1 week.

Maternal and fetal complications associated with oligohydramnios

In our study, incidence of PIH is more (50%) compared with Golan and workers (22.1%) and Crowley et al (22%).[11,12] In developing countries like India, hypertensive disorders during pregnancy ranked second to anemia. This may be reason for high incidence of PIH in present study.

IUGR

Incidence of IUGR in present study is 41%, is compared with Casey et al study in which the incidence is 24% and Golan et al 24.5%.[11,13] The incidence is more in this current study compared to the other two studies. This may be due to associated high incidence of PIH (50%).

Management and outcome caesarean deliveries

The incidence of maternal and fetal complications like pre-eclampsia, IUGR, fetal distress and abnormal doppler velocimetry are increased thereby causing risks to both mother and fetus. Therefore, the rate of caesarean section also increased.

Table 4: Management and outcome caesarean deliveries.

Study	Percentage (%)
Present study	53
Casey et al[13]	51
Sriya et al[14]	43.05
Golan et al[11]	35.2

In this present study cesarean delivery was done in 53% of cases for fetal distress. This correlates to the Casey et al (51%) and Sriya et al (43.05%) (Table 4).[13,14]

In our study decreased amniotic fluid led to increased caesarean section, but there were no maternal deaths. In study done by Rutherford et al and Sarno et al they found caesarean deliveries are common when AFI was <5.[15,16]

Meconium-stained liquor

In this present study 41% of patients had thick meconium-stained liquor which is comparable to 54% of patients who

had meconium-stained liquor in Rutherford et al study, 41.9% in Sarno et al study, and 38.88% in Sriya et al study.[14-16]

Perinatal outcome

Preterm deliveries

In a study done by Garmel and co-workers concludes that oligohydramnios before 37 weeks of pregnancy with appropriately grown fetuses had a significant 3-fold increase in incidence of preterm delivery.

In our study incidence of preterm deliveries is 43%.

Birth weight

In our study 48% of babies were of low birth weight, 35% in the study conducted by Casey et al, 58.38% in Sriya et al study and 61% in Chandra et al study.[13,14]

Yet oligohydramnios is often associated with increased incidence of low birth weight therefore, they are correlated.

Placental insufficiency has found to be the underlying cause for both oligohydramnios and low birth weight, hence justified.

Neonatal intensive care admissions

In our study high number of babies required admission to neonatal intensive care unit accounting for about 45%, when compared to Casey and coworkers (7%) study, as many were (56%) un-booked and 43% cases were preterm.

In present study, the perinatal outcome out of 65 cases of oligohydramnios, associated with risk factors, 47 babies (72.3%) had APGAR score >6, 18 babies (27.6%) had APGAR score <6.

Among 35 cases of isolated oligohydramnios, without any risk factors in our study, 77% of babies had APGAR score >6.

This correlates with the study conducted by Zhang et al who reported that isolated oligohydramnios without any risk factors and normal amniotic fluid pregnancies had same perinatal outcome.[10]

Perinatal mortality

Out of 100 cases, 10 cases were still born. Two babies died in neonatal intensive care unit, in less than 7 days of life because of meconium aspiration.

Limitations

Patients who were detected as oligohydramnios but who did not give consent couldn't be studied.

CONCLUSION

To detect pregnancies with poor perinatal outcomes, AFI measurement can be used as one of the most important methods of fetal surveillance. Ultrasound evaluation of amniotic fluid represents a useful means to identify pregnancies at risk for oligohydramnios. Pregnant women who had vaginal delivery, in spite of reactive NST and normal Doppler had MSL, NICU admissions due to low APGAR score. Hence LSCS is safe mode of delivery for AFI <5 cm. Caesarean delivery is better and safe mode of delivery than vaginal delivery as it is associated with good perinatal outcome.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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