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Study of Maternal and Fetal Outcome in Term Oligohydramnios

Shrutika B Shah, Madhuri Mehendale* and Arun H Nayak

Department of Obstetrics and Gynecology, LTMMC and LTMGH, Sion Mumbai, Maharashtra -400022

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***Correspondence Info:**
Dr. Madhuri Mehendale,
Department of Obstetrics and Gynecology,
LTMMC and LTMGH,
Sion Mumbai, Maharashtra -400022

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Abstract

Background: Oligohydramnios is defined as when the maximum vertical pockets of liquor is less than 2 cm or when amniotic fluid index (AFI) is less than 5 cm or less than 10th centile. It is one of the major causes of maternal and perinatal morbidity and mortality.
Aim: The present study was undertaken to assess the maternal and fetal outcome in AFI of 5 cm or less (oligohydramnios) in term pregnancies.
Method: In this prospective study total 100 cases with oligohydramnios (< or = 5cm) diagnosed by ultrasound after 37 weeks of gestation were enrolled and studied for maternal and fetal outcome after meeting inclusion and exclusion criteria.
Results: Mean maternal age was 25.48 years. Incidence of oligohydramnios was more (53%) in primigravida. Non stress test (NST) was reactive in 59% and nonreactive in 41% cases. 43% patients delivered vaginally, 4% delivered instrumentally and 53% by caesarean section with most common indication being fetal distress (52.83%). The occurrence of meconium stained amniotic fluid was 30%. Incidence of Low birth weight was 68% and incidence of abnormal doppler changes was found in 25% of cases. 41% of newborns were admitted in neonatal ward (NICU) with tachypnoea was commonest indication followed by baby not cried immediately after birth and meconium aspiration. There were no neonatal or maternal deaths observed in the study.
Conclusion: Oligohydramnios is associated with adverse perinatal outcome and increased maternal morbidity in terms of operative interference. Thus, proper antepartum surveillance and timely intervention is needed for better results.
Keywords: Oligohydramnios, Amniotic fluid index, Primigravida, Non stress test, Fetal distress, Tachypnoea, Morbidity, Mortality.

1. Introduction

Amniotic fluid serves to protect the fetus and umbilical cord from compression, has antibacterial properties, serves as a reservoir of water and nutrients and provides the necessary condition for normal development of fetal lung, musculoskeletal and gastrointestinal system [1]. In normal pregnancies, the volume of amniotic fluid increases to about one litre at 36 weeks which is the maximum level. Amniotic fluid volume rises progressively during gestation until 36 weeks; the mean amniotic fluid volume is relatively consistent in the level of 700-800ml. After 40 weeks there is a progressive decline of amniotic fluid volume at a rate of 8% per week, with amniotic fluid volume averaging about 400ml at 42 wks [2]. The clinical picture of reduced amniotic volume (AFI<5) is termed oligohydramnios. The sonographic diagnosis of oligohydramnios is usually based on AFI<=5 cm or on a single deepest pocket of amniotic fluid <=2cm [3].

Oligohydramnios is associated with increased risk of adverse perinatal outcome. The umbilical cord compression during labour is common with oligohydramnios which increases the risk for caesarean delivery, because of fetal distress [4]. The decrease of amniotic fluid volume is associated with the increased labour induction, still birth, non-reassuring fetal heart pattern, meconium aspiration syndrome and neonatal death [5]. The present study includes patients with oligohydramnios at term pregnancies as the etiology, management and the outcome is different in late onset oligohydramnios compared to early onset oligohydramnios. The objectives of the study were- 1) To study maternal morbidity in form of operative delivery and induced labour,

2) To study affects Oligohydramnios on fetal outcome in form of (a) fetal distress (b) Low birth weight (c) NICU admission, 3)To study APGAR scores of newborn babies in relation to Oligohydramnios, 4) To study early neonatal morbidity and mortality

2. Materials and Methods

The present prospective observational study was conducted in the Department of Obstetrics and Gynaecology at LokmanyaTilak Municipal Medical College and Hospital, Mumbai, Maharashtra, India, for a period of one year. Total 100 pregnant women's with gestational age at or more than 37 weeks and amniotic fluid index 5 cm or less were included in the study. Patients with rupture of amniotic membranes, with foetus having congenital anomalies like renal agencies, polycystic kidneys, multiple gestation, less than 37 weeks of pregnancy and with previous LSCS, myomectomy were excluded from the study. A detailed history, baseline investigations (Hb%, blood group and Rh typing, urine examination) and NST was done for all the patients. If NST found reactive, then further management is done according to protocol and if non reactive Emergency LSCS done. The ultrasound examination was done for all cases and amniotic fluid index was calculated by four quadrant amniotic fluid volume measurement technique.

All the patients in study group were given bed rest , monitored with daily fetal kick count, biweekly NST and weekly USG with color doppler, (for AFI, weight gain, interval growth, doppler changes) till completion of 37 weeks. Intervention was planned when any of the above showed abnormalities. Women with oligohydramnios, if not in labour Bishops scoring and who had high risk factors like severe pre-eclampsia, GDM were induced with dinoprostone gel after completion of 37 weeks. Patients were reassessed for bishops score 6 hrs after induction. Patients who went into spontaneous labour were accelerated with oxytocin. Patients whose bishop's score was not improved after 6 hrs were further monitored for 12 hrs.Patients were taken up for LSCS if they did not progress after 12 hrs.Those women who had no medical complications and reactive NST were followed upto 40weeks and then induced. All cases were monitored by continuous electronic fetal monitoring.Those who developed decreased beat to beat variability ,variable deceleration, late deceleration with or without meconium stained liquor which persisted after corrective measures like maternal position,oxygen inhalation, hydration and stoppage of oxytocin were taken up for LSCS. And those with doppler changes like reversal of diastolic flow,absent diastolic flow and cases with meconium stained liquor were taken up for LSCS directly.

All new born were attended by Paediatrician. Various outcome measures recorded were induced Vs spontaneous labour, nature of amniotic fluid, FHR tracings, mode of delivery, indication for caesarean section or instrumental delivery, APGAR score at 1 minutes and 5 minutes, birth weight, admission to neonatal ward, perinatal morbidity and mortality. Neonates were followed up till 7 days.

3. Observations and Results

The current study was performed on 100 pregnant women with amniotic fluid index of <= 5 cm and has completed 37 weeks of gestation. 36% of patients who had oligohydramnios were registered in our hospital and 64% of patients were referred from various periphery and private hospitals. Table 1 show the majority group and mean of antepartum variables like maternal age, gestational age and gravidity. The common antenatal complication observed in the study was preeclampsia (25%), next common was utero and fetoplacental insufficiency leading to intra uterine growth restriction was seen in 22% of the cases. Hypothyroid was seen in 10% cases.

Table 1: Antepartum variables

Variables	Majority group	No. of patients	Mean
Maternal Age (Years)	23-26	39	25.48±4.12
Gestational age (Weeks)	36-37	27	39.00±0.00
Gravida	Primi Gravida	53	-

The mean amniotic fluid index in study group was 3.33cm. Non stress test (NST) was reactive in 59% and nonreactive in 41% of cases. The rate of non-reactive NST was high in women with AFI <2cms (i.e. 68%), (Table 2).

Table 2: Distribution of cases based on AFI and NST pattern

AFI in cms	No. of Patients	NST Reactive	NST Non-reactive
0.0-1.0	15	0	15
1.1-2.0	14	1	13
2.1-3.0	18	15	3
3.1-4.0	21	17	4
4.1-5.0	32	26	6
Total	100	59	41

We could not do Doppler for all patients as they were not affording. Only 70% of cases were undergone USG with color Doppler to see changes in umblical artery. Incidence of abnormal Doppler changes was found in 25% of cases, which was highest in AFI 0-1 group(12.68%) as compared to 1.41% in AFI 4-5.3% of the study group had omnious Doppler changes in the form of absent diastolic flow.

Table 3 shows the distribution of mode of delivery. LSCS rate was high in women with oligohydramnios 53%, out of which 83% of the LSCS cases had AFI of less than 3cms. Also, out of 43% of vaginal delivery, 56% cases had AFI between 4.1 – 5.0cms. The induction of labor was also more common (39.68%) in study group with AFI 4-5. Out of 53 patients who underwent LSCS Doppler changes with fetal distress was the commonest indication (52.83%).

Table 3: AFI with mode of delivery

AFI	Instrumental	LSCS	Vaginal	Total
0.0-1.0	-	15	-	15
1.1-2.0	1	13	-	14
2.1-3.0	1	16	1	18
3.1-4.0	-	3	18	21
4.1-5.0	2	6	24	32
Total	4	53	43	100

The mode of delivery in study group based on NST was shown in table 4. Out of 59% of patients with reactive NST, 71% patients were delivered vaginally while 25.4% underwent LSCS and 34% babies went to NICU. Out of 41 patients with Non- reactive NST, 92.68% patients underwent LSCS while only 1patients were delivered vaginally. Labour induction in the study group was 39.68%, amongst those patients 85% of patient delivered vaginally but 14% patients were taken up for LSCS.

Table 4: Mode of delivery in study group based on NST

AFI in cms	NST Reactive			NST Non-reactive		
	Vaginal	LSCS	Instrumental	Vaginal	LSCS	Instrumental
0.0-1.0	0	0	0	0	15	0
1.1-2.0	0	1	0	0	12	1
2.1-3.0	1	14	0	0	2	1
3.1-4.0	17	0	0	1	3	0
4.1-5.0	24	0	2	0	6	0
Total	42	15	2	1	38	2

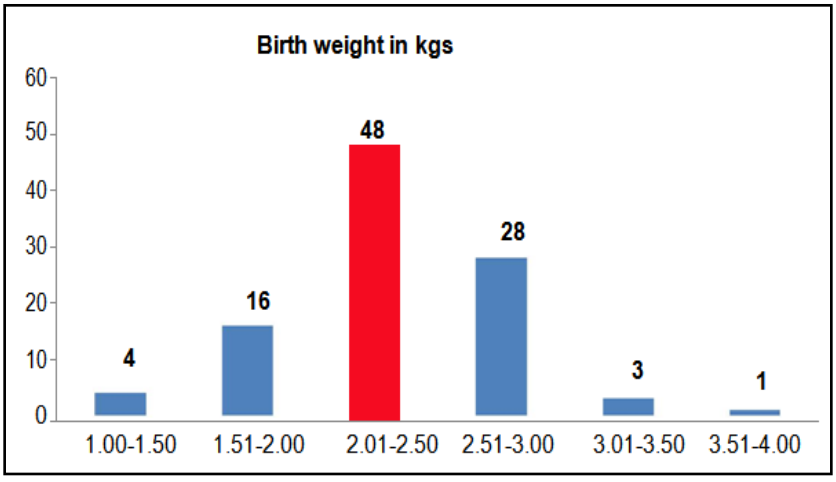
Out of patients with reactive NST (59%), 23.72% of babies went to NICU, 18.64% had MSAF and 62.71% were in low birth weight category while out of 41 of patients with Non- reactive NST, 65%of babies went to NICU, 63% had MSAF and 45%were in low birth weight category, (Table 5). The occurrence of meconium stained amniotic fluid was 30% in the study group, out of which 19 (63.33%) underwent LSCS while 53.33% of babies went to NICU. Thus we see high rate of maternal morbidity and adverse perinatal outcome in cases of patients with MSAF. Mean APGAR score at 1 min for cases was 7.94. Mean APGAR score at 5 min for cases was 8.62. APGAR score< or = 7 at 1min was 27% in study group and similarly APGAR score <7 or = 7 at 5 min was 0%.

Table 5: Perinatal outcome in study group according to NST

AFI in cms	NST Reactive				NST Non-reactive			
	MSAF	APGAR <=7 at 1 min	NICU & TCU	Birth weight <= 2.5 kgs	MSAF	APGAR <=7 at 1 min	NICU & TCU	Birthweight <= 2.5 kgs
0.0-1.0	0	0	0	0	6	8	11	11
1.1-2.0	0	1	1	1	8	8	10	10
2.1-3.0	3	2	4	9	1	1	0	3
3.1-4.0	2	1	3	9	3	3	3	3
4.1-5.0	6	3	6	18	1	0	3	4
Total	11	7	14	37	19	20	27	31

Figure 1 show the distribution of study group according to birth weight in kgs. Mean birth weight of babies was 2.37kgs. The majority of birth weights (48%) have weights between 2.01-2.50kgs, which come under low birth weight babies. The incidence of low birth weight was 68%.

Figure 1: Distribution of study based on birth record and AFI



Total 41% of newborns were admitted in neonatal ward (NICU) for morbidities like tachypnea (31.70%), birth asphyxia (12.19%), meconium aspiration (12.19%), baby not cried immediately after birth (26.82%), hyperbilirubinemia (7.31%), GDM (2.43%), sepsis (2.43%), convulsions (2.43%) and feeding difficulties (2.43%). Tachypnoea was commonest indication for NICU admission followed by baby not cried immediately after birth and then meconium aspiration. The majority of babies (18) were admitted for 1-3 days while 13 babies admitted for 4-5 days, 7 babies for 6-10 days and 3 admitted for above 10 days. There were no neonatal or maternal deaths observed in the study.

4. Discussion

The present study demonstrated that the oligohydramnios observed in antepartum testing > 37 weeks of gestation carries an increased risk of adverse perinatal outcome like the occurrence of non reactive NST, abnormal FHR tracings during labor, meconium stained liquor, development of fetal distress, the rate of LSCS, low 5 minute Apgar score, low birth weight, IUGR, NICU admission and perinatal mortality. The samples taken in the study were similar with regard to antepartum variables like maternal age, gravidity, gestational age and antenatal complications and these variables were comparable with other studies [6-8]. The incidence of oligohydramnios was in primigravida with 53% of the total study group which was similar to the study conducted by Jagatia *et al* [8]. The amniotic fluid index was measured by four quadrant semiquantitative technique in ultrasound and those with AFI <5 cm were considered as oligohydramnios. The mean AFI in study group was 3.33cm.

The rate of nonreactive NST was41% and was comparable to Kumar *et al* [9] and Sriya *et al* [10], who reported non-reactive NST rates to be 40% and 41% respectively. Out of 59% patients with reactive NST, 70% patients were delivered vaginally while 25.4% underwent LSCS and 34% babies went to NICU. This result was correlated with the previous studies [9,11,12]. Out of 41 of patients with Non- reactive NST, majority (93%)patients underwent LSCS. Thus we see increased rate of operative delivery (LSCS) and hence maternal morbidity amongst patients with oligohydramnios with Non-reactive NST. Also out of patients with Non- reactive NST, 65% of babies went to NICU, 63% had MSAF, 45%were in low birth weight category. Thus, we see that adverse perinatal outcome was more frequent with severity of oliohydromenious even though NST was reactive or non-reactive.

Hypertensive disorders which cause chronic placental insufficiency lead to oligohydramnios. In current study, 23% patients had mild or severe preeclampsia compared to 38.46% and 31% of oligohydramnios group in study by Sriya *et al* [10] and Chandra *et al* [13]. Any cause of chronic placental insufficiency including chronic abruptio and diabetes mellitus can cause fetal growth restriction and oligohydramnios in term pregnancies.

The occurrence of meconium stained amniotic fluid was high (30%) in women with oligohydramnios, this result was comparable to study conducted by Chandra *et al* [13]. 63.3% of cases were subjected to emergency LSCS in lieu of fetal distress; this was comparable to other studies [14, 15]. Labour induction in the study group was 39.68%. Induction of labour was decided depending upon AFI, gestation age, postdatism, doppler changes, associated antenatal complications and favorability of cervix. Amongst the patients which were induced 85% of patient delivered vaginally but 14% patients were taken up for LSCS. It means the rate of induction of labour was high with oligohydramnios. Various studies [16, 17] show different rates of LSCS for fetal distress in pregnant women with amniotic fluid index of <5 cm. In present study, the LSCS for fetal distress was 53% in oligohydramnios (AFI≤5). 83% of the LSCS cases had AFI of less than 3cms. Also, 56% of the vaginal delivery cases had AFI between 4.1 – 5.0cms. Thus we can see that lesser the AFI, more are the

chances of operative delivery and hence maternal morbidity. 44% of the patients with reactive NST had AFI between 4.1 – 5.0cms and 68% of the non-reactive cases had AFI less than 2 cm. The rate of LSCS was more in those with oligohydramios and non reactive NST (93%). Even with reactive NST 25% develop fetal distress and LSCS was done.

The mean birth weight for study group was 2.37kgs. The incidence of low birth weight was 68% which was comparable with other Indian studies [10, 13]. Hence it can be seen that oligohydramnios is associated with adverse perinatal outcome in the form of IUGR and low birth weight. The high incidence of low birth weight may be because of chronic placental insufficiency causing fetal growth restriction, this was comparable to study conducted by Patrozella *et al* [7]. In current study, APGAR score <=7 at 5 min was nil due to early assessment and timely intervention. 41% of newborns were admitted in neonatal ward (NICU) for tachypnea, birth asphyxia, meconium aspiration, baby not cried immediately after birth, hyperbilirubinemia, GDM, sepsis, convulsions and feeding difficulties. This was compared with the study of Chandra *et al* [13]. There was no mortality probably because of good neonatal intensive care unit facilities.

5. Conclusion

Oligohydramnios is frequent occurrence and demands intensive fetal surveillance and proper antepartum and intrapartum care. Due to intrapartum complication and high rate of perinatal morbidity and mortality, rates of caesarean section are rising, but decision between vaginal delivery and caesarean section should be well balanced so that unnecessary maternal morbidity prevented and other side timely intervention can reduce perinatal morbidity and mortality.

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