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Original Research Article

Maternal and fetal outcome in oligohydramnios after 34 weeks of gestation

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ABSTRACT

Background: Oligohydramnios is one of the major causes of maternal and perinatal morbidity and mortality. It is a clinical condition characterized by Amniotic Fluid Index (AFI) ≤5 cm by sonographic assessment. The aim of present study is to know the maternal and fetal outcome in oligohydramnios after 34 weeks of gestation compared with women who had normal volume of amniotic fluid.
Methods: Study was done for the period of 21 months from November 2014-July 2016 at Adichunchanagiri Institute of Medical Sciences, Hospital and Research Centre Bellur. 50 antenatal cases with > 34 weeks of gestation with AFI ≤5 cm by ultrasonographic estimation were included as study group and 50 women with normal AFI were included as control group. Maternal and fetal outcome of the women with oligohydramnios were analyzed and compared with control group.
Results: Results were analyzed statistically using parameters like mean, SD, Chi Sq test, P value. Amniotic fluid was clear in 32% in study and 78% in control group, thin meconium stained in 30% in study group and 14%in control group and was thick meconium stained in 38% in study group and 8% in control group (Chi square =22.31, p<0.0001). Induction of labour was done in 54% in study group and 20% in control group. Cesarean delivery was done in 58% in study group women and 28% in control group women. Regarding the birth weight of babies 62% were < 2.5 kg in study group and 18% in control group with p<0.001. 10% of babies in study group required NICU admission and perinatal mortality was 2%.
Conclusions: Due to increased perinatal morbidity and mortality and increased rate of LSCS, timely decision during labour is important to reduce perinatal morbidity and mortality.

Keywords: Amniotic Fluid Index (AFI), Bio Physical Profile (BPP), Intra Uterine Death (IUD), Lower segment cesarean section (LSCS), Meconium stained, Neonatal intensive care unit (NICU), Non-stress test (NST), Oligohydramnios, Premature rupture of membranes (PROM), Ultrasonography (USG)

INTRODUCTION

The fluid that collects within the amniotic cavity surrounding the embryo is called amniotic fluid. Hippocrates was the first person to attribute the development of amniotic fluid to fetal urine. Fetal urination is the major source of amniotic fluid, once the fetal kidney function begins at 10 -12 weeks. Fetal lung fluid is a minor contributor of amniotic fluid.[1] Amniotic fluid volume rises progressively until 32 weeks of

gestation. From 32 weeks to term the mean amniotic fluid volume is relatively constant about 600-800 ml. After 40 weeks there is progressive decline in amniotic fluid volume average of about 400 ml at 42 weeks. Amniotic fluid is removed by fetal swallowing. Normal amniotic fluid volume is critical for normal fetal growth and development.[1]

Nature has made floating bed in the form of amniotic cavity filled with liquor amnii for the requirement of fetus for its existence and growth in sterile environment, 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 the form of increased rates of induction and/or operative interference.[2] With the help of amniotic fluid estimation by amniotic fluid index (AFI) using four quadrant technique during trans-abdominal ultrasound examination as per described by Phalan et al in 1997, better identification of fetus at risk can be done.[2]

Oligohydramnios is defined as AFI ≤5 cm or less than the 5th percentile. It can occur at any time during pregnancy but is more common during the last trimester. Whenever there is continuation of pregnancy beyond 2 weeks of expected date of delivery, she may be at risk for low amniotic fluid levels since fluid can decrease by half once she reaches 42 weeks gestation. Oligohydramnios can complicate 12% of pregnancies that continue beyond 41 weeks.[3] Assessment of amniotic fluid volume by ultrasonography is more reliable. It is calculated as sum of the deepest vertical dimension in each quadrant of the uterus. Oligohydramnios is associated with increased pregnancy complication, congenital anomalies and perinatal mortality.[4]

The sequel of long-standing oligohydramnios includes pulmonary hypoplasia, Potter's syndrome, club foot. Compression of the umbilical cord between the fetus and the uterine wall may occur during contractions or fetal movement causes severe Fetal Heart Rate (FHR) decelerations which are associated with low APGAR score and acidosis at birth, meconium staining, cesarean section and operative vaginal deliveries for fetal distress.[5]

The aim of the present study was to know the prevalence and risk factors in women with AFI ≤5 cm after 34 weeks of gestation and compare with control group (normal Amniotic fluid). The objectives are to study the obstetric management during antenatal, intra-natal and postnatal period and to know the fetal and maternal outcome.

METHODS

This is a prospective case control study over a period of 21 months from November 2014 to July 2016 at Adichunchanagiri Institute of Medical Sciences Hospital and Research Centre Bellur. 50 antenatal cases with >34 weeks of gestation with AFI ≤5 cm by sonographic estimation were included as study group and 50 women with normal AFI (8-24 cm) were included as control group.

Detailed history was taken and clinical examination was done for all cases. Clinical evidence of oligohydramnios was looked for and previous obstetric and USG reports were reviewed. Only those women who remembered their last menstrual period correctly with previous 3 regular cycles and dating scan were included for the study. USG was done for all women and AFI was calculated by 4 quadrant Amniotic Fluid measurement technique.

Inclusion criteria

Women with singleton pregnancy who have completed 34 weeks and above with oligohydramnios form study group and those women with normal Amniotic fluid form control group.

Exclusion criteria

Women with gestational age <34 weeks and >42 weeks, polyhydramnios, PROM, multiple gestation, IUD, mal presentations, placenta previa, congenital anomalies were excluded from the study.

Induction of labour was done for women with high risk factors like PIH, by PGE 2 gel and accelerated with oxytocin. Spontaneous onset was allowed for women with no risk factors along with twice a week NST and weekly Biophysical profile (BPP). All cases were monitored thro continuous fetal monitoring during labour. After ARM nature of AF noted. Those who developed significant variable deceleration/ late decelerations, with or without meconium stained liquor were delivered by cesarean section. All newborn babies were seen by pediatrician.

Labour outcome of the women were recorded includes, spontaneous /induced, nature of A F, FHR tracings, mode of delivery, indication for cesarean section or instrumental delivery. Perinatal findings such as APGAR score <7 at 1 mt and 5 mt, birth weight, admission to NICU, perinatal morbidity and mortality were noted.

RESULTS

Results were analysed statistically using parameters like mean, SD, Chi square test, P value. Study group consists of 47.8% Gr 1, 52.2% Gr 2 and above and control group 52.2% Gr 1, 47.8% Gr 2 and above (Chi square=22.31, p<0.0001). Antenatal complications were not seen in 68% in the study group and 60% in control group. Mild pre-eclampsia was seen in 10% in study group and 20% in control group. Severe pre-eclampsia was present in 20% in study group and 10% in control group. Anemia

was seen in 8% in control group women only. Table 1 showing the AFI in study and control groups. In the study group 72% of women had AFI below 4.

Table 1: Amniotic fluid index in study and control group.

AFI	Study group number	%	AFI	Control group number	%
2 -3	18	36	8.1-11	21	42
3.1-4	18	36	11.1-14	16	32
4.1-5	14	28	14.1-17	13	26
	50			50	

The nature of the amniotic fluid was clear in 32% in study and 78% in control group. Amniotic fluid was thin meconium stained in 30% in study, 14% in control group and was thick meconium stained in 38% in study and 8% in control group (Chi square=22.31, p<0.0001). Regarding the onset of labour, induction was done for 54% in study group and 20% in control group. Remaining 46% in study group and 80% in control group women had spontaneous onset of labour. Table 2 showing the mode of delivery, 42% in study group had vaginal delivery compared to 61% in control group (Chi square test=27.38).

Table 2: Mode of delivery.

Mode of delivery	Study group	Control group	Total
FTND	14 (28%)	30 (60%)	44 (44%)
FTVD	7 (14%)	10 (20%)	17 (19%)
LSCS	29 (58%)	10 (20%)	39 (39%)
Total	50	50	100

Incidence of LSCS in the study group was 58% and 39% in control group. This study shows that incidence of intervention is significantly more in the study group than control group with p<0.001. Table 3 showing the indications for cesarean delivery. Occurrence of fetal distress was more in study group than control group with P value <0.02 which is statistically significant.

Table 3: Indications for LSCS.

Indications	Study group	Control group	Total
Fetal distress	25	8	33
Secondary arrest of descent	3	2	5
Total	28	10	38

Table 4: APGAR score <7.

Time	Study group	Control group	P value
1 minute	15 (30%)	5 (10%)	0.002
5 minutes	6 (12%)	1 (2%)	0.005

Percentage of birth weight of babies in study and control group is shown in Table 5. Birth weight <2.5 kg was found in 62% in study group and 18% in control group with mean of 2.4 and 2.8 in study and control group respectively (p <0.001) statistically significant.

Table 5: Birth weight of the babies in study and control group.

Birth weight	Study group	Control group	Total
<2 kg	9 (18%)	2 (4%)	11
2.1-2.5 kg	22 (44%)	7 (14%)	29
2.6-3 kg	15 (30%)	30 (60%)	45
>3 kg	4 (8%)	11 (22%)	15
	50	50	100

10% of babies required NICU admission in study group in view of meconium aspiration, birth asphyxia and seizures. Neonatal death was 2% in study group. None of the babies admitted to NICU and no perinatal mortality in Control group. The p value showed strong significance <0.001.

DISCUSSION

Estimation of Amniotic Fluid volume is an integral part of antenatal surveillance. Reduced Amniotic Fluid carries an increased risk of complications during labour in high risk pregnancies. Relationship between sonography detected oligohydramnios perinatal morbidity and mortality has been well established by Manning and Platt.[4,6] In the present study oligohydramnios was observed in 47.8% in primigravida and 52.2 % in gravida 2 and above. According to other studies Amany H et al 38% in primigravida, 58% in gravida 2 and above, Krishna J et al 52% in primigravida, Charu J et al 60% in primigravida, Kolsoum R et al 49% in primigravida.[2-4,6] Patel P et al reported 58.75% in primigravida Enas M et al reported 58.2% in primigravida.[7,8] Reddy P et al reported 60% in primigravida and 40% in multigravida.[1] The present study in comparable with Krishna J et al.[2]

Manisha S et al reported 71% of oligohydramnios cases were associated with antenatal complications such as PIH 39%, IUGR 29%, PROM 15%, Abruptio placenta 15%, compared to 36% in control group.[9] Deepika B et al reported 21% PIH, 55% anemia.[5] Reddy et al reported Anemia in 42.67%, PIH in 25.33%.[1] Veena V et al reported PIH in 17.07%, IUGR in 46.34% in study group.[11] Bhat S et al reported PIH in 33.3%, post-datism in 50%.[10] In present study 32% of oligohydramnios cases had associated complications. Manisha S et al stated AFI 0-2 in 40%, 3 -5 in 60%.[9] Reddy P et al reported 60% in primigravida and 40% in multigravida.[1] Present study AFI 2-3 was seen in 36%, 3-5 in 64%.

Manisha S et al reported, induction of labour in 65% in study group and 21% in control group.[9] Purvi Patel et al reported induction of labour 15% in study group and 6.8% in control group and spontaneous delivery in

remaining cases.[7] In present study induction of labour was done for 54% in study group and 20% in control group. According to Charu J et al induction was done for 58% and spontaneous onset of labour in 28%.[6] Present study is comparable with study reported by Charu J et al.[6]

Regarding the % of vaginal delivery reported in various studies as, Charu J et al 44%, Deepika B et al 53%, Krishna J et al 58%.[2,5,6] In present study 46% of study group had vaginal delivery. Percentage of LSCS reported by, Charu J et al 56%, Deepika B et al 47%, Krishna J et al 42%.[2,5,6] Reddy P et al reported vaginal delivery in 38.67%, LSCS in 61.33% and fetal distress was the major indication for LSCS (42.39%).[1] Veena V et al reported vaginal delivery in 62.6% and LSCS in 35.3% in women with oligohydramnios, fetal distress was indication for LSCS in 65.7%.[11] Enas M et al reported LSCS 63.69% in study group and 28.8% in control group.[8]

When authors compare incidence of vaginal delivery and LSCS with other studies, % of LSCS was high in Purvi P et al compared with present study as seen in Table 6.[7]

Table 6: Mode of delivery in study and control group.

Mode of delivery	Purvi P et al[7]		Amany H et al[3]		Veena V et al[11]		Present	
	Study	Control	Study	Control	Study	Control	Study	Control
Vaginal delivery	18.75%	73.44%	58%	80%	51.22%	67.5%	42%	80%
LSCS	81.25%	26.56%	42%	20%	48.78%	32.55%	58%	20%

In the present study baby weight was <2 kg in 18% in study group and 4% in control group and 2.1-3.0 kg in 74% in both study and control group where as Patel P et al reported 5% in study group and 2.19% in control group.[7] Baby weight <2.5 kg, was reported by Charu J et al 58%, Kolsoum R et al 29%, Krishna J et al 36%, Manisha S et al 73% and P Reddy et al 48%.[1,2,4,6,9] Present study is comparable with the study by Manisha S et al.[9]

In the present study APGAR score <7 in 30 % at 1 minute, 15% at 5 minutes in study group and 10% at 1 mt, 2% at 5 mt in control group. Reddy P et al reported APGAR score <7 at 1 minute in 33% and at 5 minutes in 20%.[1] Veena V et al reported APGAR score <7 at 1 minute in 19.51% in study group, 7.5% in control group and at 5 minutes in 12.59% in study and 2.5% in control group.[11] Enas M et al reported 5.59% at 1 minute and 2.05% at 5 minutes in study and 8.4% at 1 minute, 1% at 5 minutes in control group.[8] Manisha S et al reported 55% in study,13% in control group at 1 minute.[9] Kolsoum R et al reported 4.7% in both groups at 5 minutes, Deepika B et al reported 17.5% at 5 minutes.[4,5.]

Krishna J et al reported 22 % NICU admissions and 1 % neonatal death due to septicemia.[2] According to Enas M et al NICU admission was required for 7.6% in babies of study group and 6% babies of control group.[8] There was 1 still birth in study group due to 2 tight cord around neck and there was no immediate neonatal death in either study or control group.[1] Manisha S et al reported higher rates of NICU admissions, 44% in study group and 13% in control group because 57% women in study group had preterm labour.[9] According to Patel P et al NICU admissions was 20% in study group and 18.75% in control group.[7] Deepika B et al reported 36% NICU admissions and 15% perinatal mortality.[5] Reddy P et al reported NICU admission was needed in 32% and meconium aspiration syndrome was seen in 5.33%, still birth was 0.67% and perinatal death was seen in 2%.[1] In present study NICU admission was done for 10% in study group. There was 2% neonatal death in study group. None of the babies in control group admitted to NICU. Manisha S et al reported 16% neonatal death.[9] Amany H et al reported 15% NICU admission in study group and 3% in control group.[3] NICU admission was required in 16% in study reported by Charu J et al, 1% in Kolsoum R et al and 28% in Veena V et al.[4,6,11]

CONCLUSION

To conclude in presence of oligohydramnios a thorough evaluation for hypertension, PIH, diabetes PROM etc. should be done. An AFI ≤5 cm detected after 28 weeks was associated with adverse pregnancy outcome and poor perinatal outcome. Determination of AFI should be used as an adjunct to other fetal surveillance methods and is a valuable test for predicting fetal distress in labour requiring cesarean delivery.

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