

Research Article

Effect of isolated oligohydramnios in otherwise normal term pregnancy

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Abstract

Objectives: To study the perinatal outcome in term oligohydramnios and to compare the mode of delivery in patients with oligohydramnios with the control group (AFI>5).

Methods: The study was a prospective study carried out in the department of obstetrics and gynaecology at K.V.G. Medical College and Hospital, Sullia over a period of 1 year from January 2012 to December 2012. A total of 100 patients of gestational age >37 weeks were studied, of which 50 had an AFI≤ 5 and were included in the study group and 50 had an AFI>5 and were allocated to the control group. Patients allocated to both groups were low risk and were not associated with any maternal or fetal complication. The mode of delivery and the perinatal outcome was compared between the two groups. Chi square test was used for statistical analysis.

Results: The rate of caesarean section was 68% in the group with oligohydramnios and 28% in the group with normal liquor volume. The difference was significant. The incidence of intrauterine growth restriction was significantly high in the study group (48%) as compared to the control group (22%). The prevalence of thick meconium (8% vs 6%) and non reassuring non stress test (12% vs 8%) was not significantly different in between the two groups. The fetal outcome as assessed by the apgar score and the neonatal intensive care unit admission rate (14% vs 4%) were not different in between the two groups. There were no babies needing ventilatory support and no perinatal deaths in either of the two groups.

Conclusion: Isolated oligohydramnios in the absence of any other maternal or fetal complicating factor is not found to adversely affect the fetal outcome, though the fetal weight may be slightly lower in babies born to mothers with oligohydramnios. The incidence of caesarean section for fetal distress is higher in patients with oligohydramnios.

Keywords: isolated oligohydramnios, amniotic fluid index, intrauterine growth restriction

1. Introduction

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. Oligohydramnios has been defined as liquor volume less than the 5th percentile for that gestational age¹, single deepest pocket or maximum vertical pocket of less than 2 cm² or amniotic fluid index (AFI) of less than 5 cm^{3,4}. It affects 2.4% of pregnancies between 36-40 weeks^{3,4} and 12% of pregnancies at 41 weeks or later⁵. Early onset oligohydramnios has been associated with fetal congenital anomalies and poor fetal outcome⁶. Oligohydramnios in third trimester may be responsible for malpresentation, umbilical cord compression and thick meconium stained liquor. Several studies have shown association of oligohydramnios with an increased caesarean delivery rate⁷, an increase in non reassuring fetal heart rate (FHR) pattern and adverse perinatal outcome⁸. Conversely using the RADIUS trial database, Zhang and colleagues⁹ reported that isolated oligohydramnios was not associated with adverse perinatal outcome. Due to these conflicting reports, we decided to study the impact of isolated oligohydramnios in normal term pregnancies on labour and perinatal outcome.

1.1 Aims and Objectives

1. To study the perinatal outcome in term oligohydramnios.
2. To compare the mode of delivery in patients with oligohydramnios with the control group (AFI>5).

2. Materials and methods

The present study was carried out in the department of obstetrics and gynaecology at K.V.G. Medical College and Hospital, Sullia over a period of one year from January 2012 to December 2012. A total of 100 patients of gestational age >37 weeks were studied, of which 50 had an AFI≤ 5 and were included in the study group and 50 had an AFI>5 and were allocated to the control group.

2.1 Inclusion criteria:

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

2.2 Exclusion criteria:

- Patients with rupture of amniotic membranes
- Patients with foetus having congenital anomalies
- Multiple gestation

- Gestational age <37 or >40 weeks
- High risk pregnancy eg:
 1. Placental insufficiency
 - a. Chronic hypertension
 - b. Preeclampsia
 - c. Diabetes
 - d. Hypovolemia
 - e. Chronic renal disease
 - f. Connective tissue disorders
 2. Abruption
 3. Prostaglandin synthetase inhibitors therapy
 4. Angiotensinogen converting enzyme inhibitors therapy
 5. Patients with previous caesarean section, myomectomy etc.

2.3 Procedure

All antenatal low risk patients with gestational age of 37-40 weeks attending the outpatient department were subjected to a routine ultrasound examination. AFI was measured using the technique described by Phelan *et al*³. 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 were then grouped according to their AFI. Fifty patients with AFI ≤ 5 were allocated to the study group and 50 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 the study. A written informed consent was taken from all the patients.

On admission, non stress test (NST) was done for all women in both the study and control groups. If NST was non reassuring, emergency caesarean section was done. If NST was reassuring, further management was decided based on whether the patient was in labor or not. If patient was not in labor, she was induced with prostaglandin E2 (dinoprostone) gel intravaginally. A maximum of 2 doses of dinoprostone were used 6 hours apart for induction. Once the patient went into active labor, artificial rupture of membranes (ARM) was done at 4 cm dilatation and colour of liquor was noted. Partogram was plotted to know the progress of labor. All cases were monitored by continuous electronic fetal monitoring. Oxytocin drip was started if contractions were weak. If there were late decelerations, persistent bradycardia or persistent tachycardia, the delivery was expedited by operative intervention. All newborns were attended by the paediatrician. The birth weight and apgar score at 1 and 5 minute were noted. If the apgar score was low or the baby had respiratory distress, the baby was admitted to the neonatal intensive care unit (NICU). The various outcomes recorded were NST, induced or spontaneous labour, colour of liquor, mode of delivery, apgar score, NICU admission, need for ventilatory support and perinatal deaths.

2.4 Statistical methods: Chi square test was used for statistical analysis.

3. Results

Total number of cases studied were 100, out of which 50 were in the study group and had an AFI ≤ 5 and 50 were in the control group and had an AFI > 5. The two groups were comparable with respect to age, parity, period of gestation and labor characteristics as seen in table 1.

Table 1- Baseline data

Characteristics	Study (n=50)	Control (n=50)
Average age (years)	22.86	23.08
Parity		
Primigravida	n=26, 52%	n=28, 56%
Multigravida	n=24, 48%	n=22, 44%
Period of gestation	39.2	39.5
Induced labor	n=21, 42%	n=16, 32%

Table 2- Comparison of outcome in study and control group

Outcome	Study Group		Control Group	
	Number	Percent	Number	Percent
NST				
Reassuring	44	88	46	92
Non reassuring	6	12	4	8
Mode of delivery				
Vaginal delivery*	16	32	36	72
Caesarean section*	34	68	14	28
Colour of liquor				
Clear	34	68	41	82
Thin meconium	12	24	6	12
Thick meconium	4	8	3	6
Apgar score at 5 min				
<4	3	6	0	0
4-7	4	8	2	4
>7	43	86	48	96
NICU admission	7	14	2	4
Birth weight < 2.5 kg*	24	48	11	22
Babies needing ventilatory support	0	0	0	0
Perinatal deaths	0	0	0	0

*statistically significant

Table 2 shows the various outcomes of the study. NST was reassuring in 44 patients (88%) in the study group and 46 patients (92%) in the control group (p value >0.05). The difference was not statistically significant.

In the study group, 16 of the 50 patients (32%) had vaginal delivery and 34 patients (68%) underwent caesarean section, whereas 36 of the 50 patients (72%) delivered vaginally and 14 patients (28%) delivered by caesarean section in the control group (p value <0.05). This difference was statistically significant. Table 3 shows the indication for caesarean section in both the groups. In patients with oligohydramnios, 50% underwent caesarean section for fetal distress, 26.47% for intrauterine growth restriction (IUGR) with doppler changes, 14.7% for failed induction and 8.82% for cephalopelvic disproportion. In patients with AFI>5, indication for caesarean section were fetal distress in 35.7%, intrauterine growth restriction in 7.14%, failed induction in 21.43% and cephalopelvic disproportion (CPD) in 35.7% respectively.

Table 3 – Indication for caesarean section

Indication for LSCS	Study Group AFI ≤ 5 CM		Control Group AFI > 5		Total
	N	%	N	%	
Fetal distress	17	50	5	35.7	22
IUGR with doppler changes	9	26.47	1	7.14	10
Failed induction	5	14.7	3	21.43	8
CPD	3	8.82	5	35.7	8
Total	34	100	14	100	48

4 patients (8%) with oligohydramnios had thick meconium stained liquor on ARM as compared to 3 patients (6%) in the group with normal liquor volume (p value >0.05). The difference between the two groups was not statistically significant.

Table 4- Birth weight of babies

Birth Weight	Study Group AFI ≤ 5		Control Group AFI ≥ 5		Total
	N	%	n	%	
>3 KG	4	8	15	30	19
2.5- 3 KG	22	44	24	48	46
2- 2.4 KG	17	34	8	16	25
<2 KG	7	14	3	6	10

Apgar score <7 was seen in 7 patients (14%) with AFI≤ 5 and in 2 patients (4%) with AFI>5 (p value >0.05). The difference was not statistically significant. Table 4 shows the birth weight of the babies. 24 babies (48%) in the study group had birth weight <2.5 kg, whereas 11 babies (22%) in the control group had birth weight <2.5 kg (p value <0.05). This difference was statistically significant. 7 babies in the study group (14%) were admitted to the neonatal intensive care unit (NICU), whereas 2 babies (4%) in the control group had NICU admission (p value >0.05). The difference was not statistically significant. All the babies were stable at the time of discharge. There were no babies needing ventilatory support and no perinatal deaths in either the study or control groups.

4. Discussion

The present study was done to know the labour outcome and perinatal outcome in low risk term pregnancies with isolated oligohydramnios. In our study, labour was induced in 42% of patients in the study group as compared to 32% in the control group. Our results correlate with the results of the study done by Casey and co workers⁸ (42% vs 18%). There was no significant increase in the rate of labour induction in patients with oligohydramnios. The incidence of caesarean section was 68% (n=34) in patients with oligohydramnios and 28% (n=14) in those with normal liquor volume. The difference in between the two groups was statistically significant (p value <0.05). Baron and co workers¹⁰ 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. Non reassuring NST was seen in 6 patients in the study group and 4 patients in the control group, the difference not statistically significant. Meconium stained liquor (thick and thin) was seen in 32% of patients with oligohydramnios and 18% of control patients, the difference being significant (p value <0.05), but the incidence of thick meconium stained liquor was not significant (8 vs 6%). Intra uterine growth restriction was seen in 48% (n=24) of the babies in the study group and 22% (n=11) of the babies in the control group (p value <0.05), the difference being statistically significant. Among the patients with oligohydramnios 14% of the babies had an apgar score <7 and needed NICU admission, while 4% of the babies in the control group required NICU admission (p value >0.05), the difference was not significant. Casey *et al*⁸ reported an NICU admission rate of 7% in patients with oligohydramnios. There were no perinatal deaths in either of the groups.

Oligohydramnios is seen in 2.4- 3.9% of all pregnancies. Early onset oligohydramnios is one of the first clue to an underlying fetal abnormality (chromosomal abnormality or congenital anomalies). Late onset oligohydramnios is associated with maternal diseases like chronic hypertension, pre eclampsia, uteroplacental insufficiency, hypovolemia, drugs, twin pregnancy, fetal demise, ruptured membranes and post term pregnancy. Isolated oligohydramnios is diagnosed when no other unfavourable maternal and fetal condition coexists. The decrease in amniotic fluid volume was associated with increased labour induction, still birth, non reassuring fetal heart rate pattern, meconium aspiration syndrome and neonatal death. The possible explanation of the increased perinatal morbidity and mortality could be due to umbilical cord compression, potential utero-placental insufficiency and the increased incidence of meconium stained amniotic fluid in oligohydramnios. Each of the risk factors associated with late onset oligohydramnios can predispose the fetus to adverse outcome. Thus, it is not entirely clear whether the adverse perinatal outcomes merely reflect the sequelae of other conditions or if reduced amniotic fluid volume itself contributes to the adverse outcomes.

In our study although there is an increased incidence of caesarean section for fetal distress and low birth weight in patients with oligohydramnios, there was no associated increase in perinatal morbidity or mortality. Zhang *et al* and colleagues⁹ in their study showed that isolated oligohydramnios was not associated with an increased incidence of operative delivery or increased perinatal morbidity, though these foetuses were lighter by 100 gm at birth. They also noted that oligohydramnios with unfavourable maternal and/or fetal conditions (such as IUGR, anomalies or hypertension) leads to a much worse perinatal outcome than a normal amniotic fluid volume with the same conditions. In these cases, oligohydramnios may be an indicator of a more severely impaired placental function, fetal compromise and worse maternal or fetal conditions. Garmel *et al*¹¹ compared outcomes of 65 women with isolated oligohydramnios (amniotic fluid index ≤ 8 cm) and an appropriately grown fetus before 37 weeks to those of a normal amniotic fluid index control group matched by sonogram indication. There was no significant difference in risks of caesarean delivery, IUGR, intrauterine death or birth asphyxia. The increased rate of operative delivery in our study could be because the diagnosis of fetal distress was made depending on the fetal heart rate tracings alone. Fetal acidosis was not proved by fetal scalp blood sampling or other methods due to non availability.

5. Conclusion

Oligohydramnios is a frequent occurrence in obstetric practice and is often associated with other maternal and fetal complication. Isolated oligohydramnios without any complicating factor is not associated with adverse perinatal outcome, though the babies may have a lower birth weight. The high rate of caesarean section in our study could be because fetal distress was not confirmed by fetal scalp blood sampling. This requires further studies using scalp blood pH analysis.

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