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Original Research Article

A study of fetomaternal outcome in induction of labour in third trimester oligohydramnios

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ABSTRACT

Background: The Induction of labor in oligohydramnios poses a dilemma for obstetrician. Studies are limited with variable results. This study aims at finding whether isolated oligohydramnios is an indication for operative delivery or labor induction followed by vaginal delivery is possible.

Methods: A prospective study carried out on females delivered in study duration in Umaid Hospital, Jodhpur, Rajasthan. Outcomes studied were gestational age at delivery, colour of amniotic fluid, FHR tracings, mode of delivery, indication for cesarean section or instrumental delivery, Apgar score at one minute and five minutes, birth weight, admission to Neonatal Intensive Care Unit (NICU), perinatal morbidity and perinatal mortality. Descriptive statistics were applied and data was represented on frequency tables, graphs and diagrams.

Results: 40% of subjects had amniotic fluid index (AFI) <5 cm and 60% demonstrated AFI between 5-7 cm. 60% of patients induced delivered vaginally with (38.33%) having AFI <5 cm. Operative delivery was resorted to in 40% of patients. Perinatal outcomes resulted in total 97% of babies discharged in healthy condition.

Conclusions: Labor induction is feasible in idiopathic oligohydramnios. Fetal distress is the most feared and predicted outcome with labor induction in oligohydramnios. This study deduced that in majority- reason for c-sections was failed labor induction due the poor Bishop's score, not fetal reasons. We hope by putting at rest apprehensions of obstetrician regarding this notion rate of c-sections could be reduced.

Keywords: Amniotic fluid index, Induction, Oligohydramnios, Neonatal outcomes, Term gestation, Vaginal delivery

INTRODUCTION

Oligohydramnios is an important flash sign. Once it comes, myriad of possibilities come to head of obstetrician. Be it IUGR, anomalies, rupture of membranes a few to name. As liquor amnii is food and air of a fetus - oligohydramnios poses a dilemma for treating physician. Evidence, based treatment options are few to none. Oligohydramnios is frequent occurrence and demands intensive fetal surveillance and proper

antepartum and intrapartum care.¹ Day to day approach seems varying with each obstetrician.

Due to intrapartum complications 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 is prevented and other side timely intervention can reduce perinatal morbidity and mortality.¹ This study explores whether labour

induction can be recommended for term women with isolated oligohydramnios.

The objective of this study was to study incidence of oligohydramnios. To study rates of success of induction. To study perinatal outcomes. To study rate of cesarean sections.

METHODS

This is a prospective study conducted at Umaid Hospital, Dr. S. N. Medical College, Jodhpur, Rajasthan. All women with reporting to Umaid Hospital from 1st May 2013 to 15th December 2013 were enrolled. All antenatal patients with required requisites who have enrolled and delivered in Umaid Hospital during study duration.

Inclusion criteria

- Gestational age more than 28 weeks of gestation.
- Cephalic presentation
- Intact membranes
- Amniotic fluid index between 5-7 cm and or <5 cm.

Exclusion criteria

- Gestational age <28 weeks
- Associated fetal malformations
- Ruptured membranes
- Malpresentation
- Multiple gestation.

Study procedure

- Informed consent was taken from every patient regarding inclusion in study
- Informed consent for induction was taken from every patient, as is a routine in our centre
- An assessment chart for each patient was prepared
- After selection of cases, detailed history including (obstetric history, menstrual history, past history, family history, personal history) was taken. Complete examination (general examination, systemic examination, abdominal examination and pelvic examination) was done
- Clinical evidence of oligohydramnios was looked for and confirmed by ultrasound examination
- Induction was done by Prostaglandin gel, sweep stretching tab Misoprost (25 microgram), oxytocin drip.
- Assessment was done 6 hours after in PG gel inserted, 4 hours after in tab misoprost, 12 to 24 hours after in sweep stretch and after 6 hours in oxytocin group by Bishop's score
- Fetal monitoring was done by intermittent electronic monitoring and hand held doppler
- Various outcome measures recorded were gestational age at delivery, colour of amniotic fluid, FHR tracings, mode of delivery, indication for cesarean

section or instrumental delivery, Apgar score at one minute and five minutes, birth weight, admission to Neonatal Intensive Care Unit (NICU), perinatal morbidity and perinatal mortality.

RESULTS

The following inferences were drawn from this study

The incidence in our study was 3.9%. Majority of the subjects 67% were booked antenatally. Where 89% of urban population was antenatally booked. Out of rural population antenatal booking was found in 47% only.

Most of the patients belonging to middle class were ANC booked (45/61) i.e. 73.77%.

Rural population constituted 53% of the subjects. Among these 17 women i.e. 32% were referred patients. This rise at a tertiary centre, of rural population is attributable to various schemes imparting referral transport, free medicines, incentives recently introduced to help avail health care facilities at no cost to the patient and family.

Majority of patients belonged to Hindu community 83%. This being ascribed to geographic distribution mainly.

Primigravida ladies contributed to 62% of cases. 40% of subjects had AFI <5 cm and 60% demonstrated AFI between 5-7 cm.

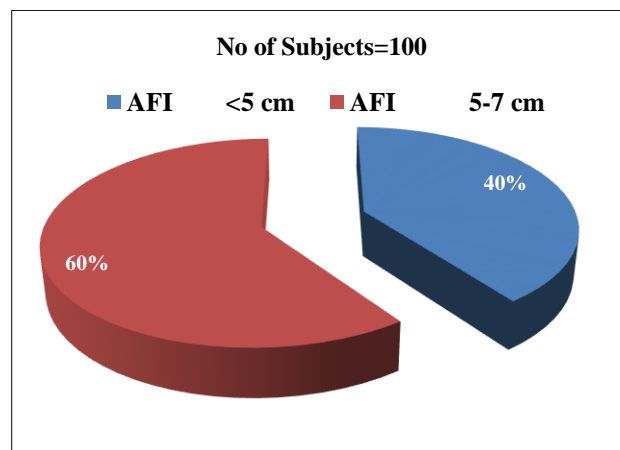


Figure 1: Distribution of subjects according to AFI.

Among the patients 16% complained of abdominal pain at admission. Fetal movements decrement or loss impelled 13% patients to seek care. Rest of the patients had no complaints. 40% of subjects had AFI <5 cm and 60% demonstrated AFI between 5-7 cm.

There were 37% of per abdomen examinations were assessed to be approx 38 weeks. Total 83% of subjects belonged to 36-40 weeks gestational age. Mean gestational age is 36.3±2.43 weeks.

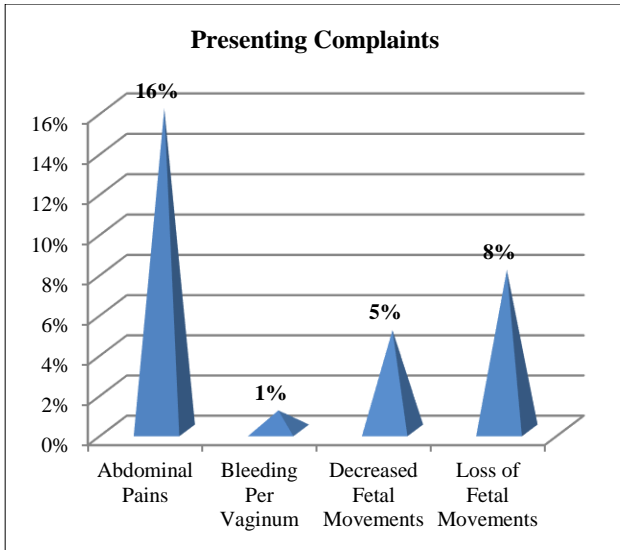


Figure 2: Presenting complaints.

Proportions of age, gravidity, gestational age, chief complaints and AFI of population selected is as follows:

Table 1: Variables.

	Years	Number	%	
Maternal age	<20	8	8%	
	20-29	84	84%	
	30-39	8	8%	
Gravidity distribution		Number	%	
	G 1	62	62%	
	G 2	18	18%	
	G 3	16	16%	
	G 4	3	3%	
	G 5	1	1%	
Chief complaints		Number	%	
	Abdominal pains	16	16%	
	Bleeding per vaginum	1	1%	
	Decreased fetal movements	5	5%	
	Loss of fetal movements	8	8%	
Gestational age by per abdomen examination		Weeks	Number	%
	32	10	10%	
	34	07	07%	
	36	29	29%	
	38	37	37%	
	40	17	17%	
Amniotic fluid index		Number	%	
	AFI <5 cm	40	40%	
	AFI 5-7 cm	60	60%	

At 40 weeks 9/17= 52.94% women had AFI <5 cm. While at 38 weeks number fell to 12/37=32.43%. At 38 weeks 25/37 =67.56% women had AFI between 5-7 cm.

Mode of induction used was prostaglandin E2 gel in 65% of women. 3% women were induced with double gel. 2% subjects were induced with two modes of induction. Modes of induction employed in our study being prostaglandin E2 gel, tablet misoprost, sweep stretching the membranes and oxytocin drip. Latter been used only in 1 case.

Augmentation was required in 37% of cases. Out of those 37 patients 10 patients had cesarean section (10/37 = 27.02%).

Operative delivery was resorted to in 40% of patients. 17/40 (42.5%) having AFI <5 cm. 60% of patients induced delivered vaginally with 23/60 (38.33%) having AFI <5 cm.

Fetal distress was the indication to the cesarean section in 8/40 = 20% of patients who underwent LSCS. 24/40 = 60% cases having 'failure of induction' as indication of LSCS as decided by poor Bishop's score at the time of assessment.

Mode of induction in relation to AFI, mode of delivery and indications of LSCS.

Table 2: Outcomes (Labor).

		Number	%
Mode of induction	Gel	65	65%
	Sweep/stretching the membranes	29	29%
	Misoprost	03	03%
	Oxytocin	01	01%
	Double mode of induction	02	02%
	Correlation between AFI and mode of delivery		AFI <5 cm
Vaginal delivery		23 (23%)	37 (37%)
LSCS		17 (17%)	23 (23%)
Indication of LSCS		Indication	Number
	Failed induction	24	24%
	Failed progress	5	5%
	Fetal distress	8	8%
	CPD	1	1%
	DTA	1	1%

No difference was found in incidence of oligohydramnios with respect to sex of baby. Both male and female were in 1:1 ratio. 5 minute APGAR score <7 occurred in total of 10% babies.

Post-delivery fetal outcomes viz. Weight, 5 minute APGAR score, NICU admission, discharge day and maternal complications.

Group having AFI <5 cm saw 7/10 babies. Out of total 10 babies with low APGAR at 5 minutes, 1 expired in

neonatal period. 1 baby was delivered dead intra uterine. 1 baby was declared still born.

Table 3: Outcomes (fetomaternal).

	In kgs	Number	%
	Birth weight	1.5-2.0	14
2.1-2.5		30	30%
2.6-3.0		43	43%
3.1-3.5		10	10%
3.6-4.0		2	2%
More than = to 4.1		1	1%
Small for gestational age versus appropriate for gestational age		AFI <5 cm	AFI 5-7 cm
	SGA (n=24)	07	17
	AGA (n=76)	31	45
Fetal complications		AFI <5 cm	AFI 5-7 cm
	IUGR (n=19)	5%	14%
	Meconium stained liquor (n=7)	2%	5%
5 minutes apgar score <7		Number of babies	%
	AFI <5 cm	7	7%
	AFI 5-7 cm	3	3%
Fetal outcomes		AFI <5 cm	AFI 5-7 cm
	NICU admission (n=7)	5 (5%)	2 (2%)
	Intrauterine death	1 (1%)	-
	Still born	-	1 (1%)
Perinatal outcomes of baby		AFI <5 cm (N=40)	AFI 5-7 cm (n=60)
	Discharged alive	38	59
	Expired	2	1
Maternal outcomes		AFI <5 cm	AFI 5-7 cm
	Atonic PPH	2	1
	Traumatic PPH	2	-

IUGR and Meconium stained liquor complicated course of total 26% of babies. Meconium stained liquor was found in total of 7 babies, of them 1 succumbed to intrauterine death. 1 baby born still and other who expired in neonatal period were small for age babies. Mothers of these babies didn't have any antenatal check-ups.

The complaint of loss of fetal movements was found in 8% of patients out of which 1 went to NICU; rest 7 babies mother shifted. The baby who went to NICU was delivered vaginally. No fetal distress was found. In all 5 delivered vaginally while 3 had LSCS done.

The complaints of decreased fetal movements found in 5% patients out of which 4 delivered vaginally and only one by LSCS. 1 intrauterine dead baby was born in this group.

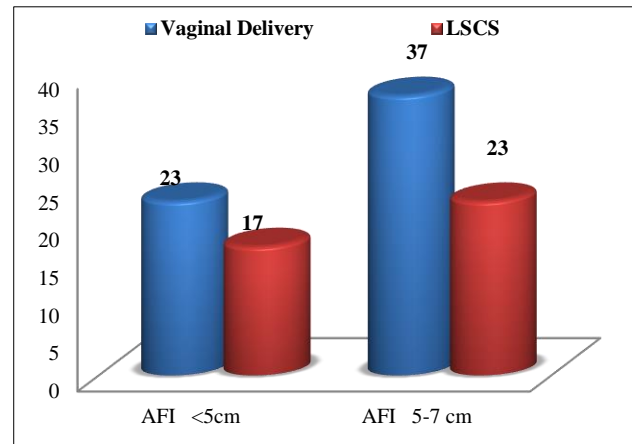


Figure 3: Correlation of AFI and mode of delivery.

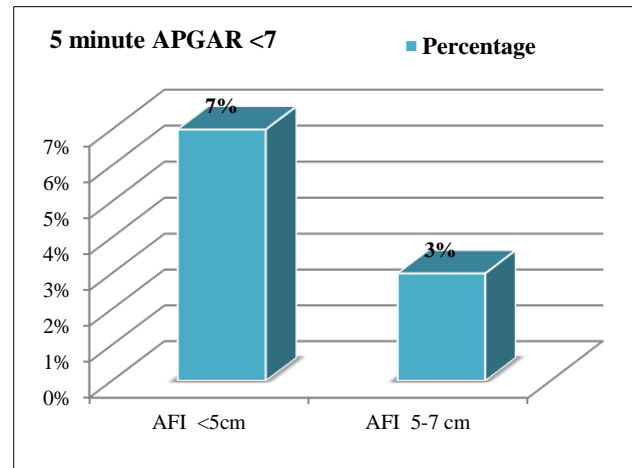


Figure 4: Correlation between baby outcomes and AFI.

Total adverse outcomes were found in 9% of cases. 77.77% of cases were unbooked.

Geographic location didn't amount to any significant differences however as neonatal admissions were 3 in case of rural population and 4 in urban population. Still born baby belonged to urban population while intra uterine dead fetus was observed in mother belonging to rural population.

44% babies had weight <2500 grams. A total of 56% babies were born >2500 grams birth weight. 1 baby had weight more than 4.1 kg. Mean baby weight in present study is 2.61±0.478 kg.

Evaluation of gestational age after delivery revealed 24% babies were found to be <10th centile. 7/24 (29.16%) of babies had AFI <5 cm.

Among babies with birth weight <10th percentile only 2 were preterm, while 22 were at term.

Perinatal outcomes resulted in total 97 % of babies discharged in healthy condition. 3% perinatal mortality observed - 1 stillborn, 1 intrauterine death and 1 expired after 7 days. Among 40 babies of AFI <5 cm 95% were discharged alive. In group with AFI 5-7 cm adverse outcome observed in only 1.66% cases.

Adverse maternal outcomes were reported in 5% of patients. 3 cases of Atonic PPH and 2 having Traumatic PPH. 2% cases of PPH observed in operative delivery and intrauterine packing done

DISCUSSION

The incidence of oligohydramnios in our study is 3.9%.

As deduced in various studies, Primigravida ladies contributed to 62% of cases. 24/62 (38.70%) were in class of AFI<5 cm and 38/62 (61.29%) were in AFI 5-7 cm group.

Reason might be that majority of the multigravida women are managed at PHC, CHC, and district hospitals level. Majority of the urban families owing to higher awareness prefer tertiary care centre for primi deliveries. And lastly rural patients who are aware enough to get a sonogram done, when informed of oligohydramnios prefer tertiary centre care.

Results of this study are identical to studies by Guin G et al, had 49.9% primi gravida ladies.²

Zhang J et al, reported 45/86=53% primi women in the study.³

Among the patients 16% complained of abdominal pain at admission. Fetal movements decrement or loss impelled 13% patients to seek care. Rest 70% had no complaints. Complaints of decreased fetal movements, loss of fetal movements were due to uteroplacental insufficiency, hypoxic changes and less spacious environment surrounding the fetus associated with oligohydramnios.

40% of subjects had AFI <5 cm and 60% demonstrated AFI between 5-7 cm.

Shrestha D, study showed 55% cases belonged to AFI <5 cm and 45% cases with AFI 5-10 cm.⁴

Rossi AC et al, observed AFI <5 cm as cut off.⁵

Achalabi et al had AFI <5 cm and AFI >5 cm.⁶

Locatelli et al compared perinatal outcome between cases with AFI ≤5 cm and those with AFI >5 cm.⁷

Danon D et al, studied 67 pregnancies with AFI ≤5 cm with 276 women with AFI >5 cm.⁸

Chate P, studied patients with AFI ≤5 cm after 37 completed weeks of gestation within 7 days of delivery.⁹

37% of per abdomen examinations were assessed to be approximately 38 weeks. Total 83% of subjects belonged to 36-40 weeks gestational age. Mean gestational age came out to be 36.3±2.43 years. These findings indicate that the problem of oligohydramnios was more common in the later part of pregnancy. The reason for mean maternal age being at term is rural patients getting a sonogram done when they seek the health facility's care and that is usually at term. In urban population who are antenatally booked, routine sonogram is ordered in 3rd trimester, hence more diagnosis at term. Also due to physiological or pathological causes of reduced placental perfusion near term.

Jun Z et al, reported mean gestational age to be 38.1±3.3 weeks.³

At 40 weeks 9/17=52.94% women had AFI <5 cm. While at 38 weeks number fell to 12/37=32.43%. At 38 weeks 25/37=67.56% women had AFI between 5-7 cm. It indicates at term more number of patients falling in AFI <5 cm group. Which might be due to physiological decrease in amniotic fluid volume approaching term.

Mode of induction used was prostaglandin E2 gels in 65%.3 women were induced with double gel. 2 subjects were induced with two modes of induction. Modes of induction employed in our study being prostaglandin E2 gel, tablet misoprost, sweep stretching the membranes and oxytocin drip. Latter been used only in one case. Augmentation (ARM, Oxytocin) was used in 37% of cases. Among augmentation needing subjects 27.02% ended having cesarean section.

Identically, Achalabi HA et al studied like us induction of labour in all subjects and perinatal outcomes.⁶

Melamed N et al, found 50% induction in isolated oligohydramnios group while only 9.6% in class with normal amniotic fluid.¹⁰

Rossi AC et al told that in 30% of women labour was induced.⁵

Ahmad H et al showed rate of induction in exposed group was 63% whereas 14% in unexposed group.¹¹

Operative delivery was resorted to in 40% of patients.17% having AFI <5 cm.

Our study is close to Bangal VB et al observed that, 56% had spontaneous vaginal delivery and 44% had cesarean delivery.¹²

Our study results are also identical to Ahmad H et al reported 57.7% vaginal delivery and 42.3% cesarean deliveries in exposed group. In unexposed group 82% vaginal and in 18% cesarean route delivery.¹¹

Locatelli et al, found incidence of operative vaginal deliveries among 341 patients to be 15.2% .⁷

Zhang J et al, found that overall cesarean delivery rates in women with oligohydramnios 19% (16/86) and with normal AFI 14% (920/6571).³

Melamed N et al, reported women in isolated oligohydramnios group were more likely to undergo cesarean delivery approx 47.2%.¹⁰

Achalabi HA et al, found 39.4% women underwent cesarean in group with AFI <5 cm and 14% in AFI >5 cm group.⁶

Rossi C et al, showed obstetric intervention was required in 254/657 women i.e. 38.66%. Among, these vaginal deliveries occurred in 76/254 cases i.e. 29.8% and caesarean section in 178/254 cases i.e. 70.2%.⁵

Chate P et al, calculated LSCS was done in 64%.⁹

Fetal distress was the indication to the cesarean section in 8/40=20% of patients who underwent LSCS. 24/40=60% cases having failure of induction as indication of LSCS as decided by poor Bishop's score at the time of assessment.

Locatelli et al, reported LSCS due to fetal distress in 8.2% of cases having AFI <5 cm.⁷

Achalabai HA et al, found 18 out of 26 cesarian (69.23% of cesarean) to be due to fetal distress. Of total n=66 deliveries 27.3% had cesarean deliveries due to fetal distress.⁶

Zhang J et al, reported 1% (1/86) incidence of cesarean due to fetal distress and 3% (197/6571) in normal AFI group.³ 5 minutes APGAR score <7 occurred in total of 10% babies. Group having AFI <5 cm had 7/10 babies.

Out of total 10 babies with low APGAR at 5 minutes 1 expired in neonatal period. 1 baby was delivered dead intra uterine. 1 baby was declared still born.

Results of present study are similar to that of Bangal VB et al, found that 16% babies had APGAR less than seven at 5 minutes.¹² Out of 16 babies 8 died during neonatal period.³ babies were delivered by LSCS who had low APGAR score.

Zhang J et al, reported an APGAR score of <7 at 5 minutes in 1.2% in both groups (with oligohydramnios and without oligohydramnios).³

Similar study by Locatelli et al, of 341 patients with oligohydramnios, found no significant difference for APGAR score of seven at 5 minutes.⁷

The sex ratio in Rajasthan is 926 females per 1000 males but in this study, it came out to be 1:1, which could be a chance factor.

44% babies had weight \leq 2500 grams. Most patients were at 38 weeks of gestation age. A total of 56% babies were born >2500 grams birth weight. 1 baby had weight more than 4.1 kg. Mean baby weight in present study is 2.61 \pm 0.478 kg. 83% of women were found to be of gestational age 36-40 weeks. Pre term births were only 17%. Most patients with SGA are found to be per abdominally of 38 weeks gestation.

Locatelli et al, showed neonates with birth weights <10th percentile to be 13.2% versus 5.5% in control group.⁷ Our study had alike results with Melamed N et al, who showed mean baby weight to be 2762 \pm 371 kg in oligohydramnios group and 3146 \pm 539 kg in normal AFV group.¹⁰

Bangal VB et al, showed that by birth weight <1000 gms were 02; 1000-2000 gms 38 women; 2000-3000 gms-58 women; >3000 gms-02 women. Mean \pm SD 2140.00 \pm 0.51 gms.¹²

Alchalabi et al, showed 10.6% having birth weight <2500 and 89.5% having birth weight >2500 in AFI <5 cm group.⁶

Locatelli et al, obtained inferences being birth weight 3330 \pm 403 gms in AFI <5 cm set and 3488 \pm 406 gms in AFI >5 cm group.⁷

Zhang J et al, observed baby weight as 3353 kg and 3465kg in isolated oligo group and normal AFV group.³

The difference in baby weights between our study and of western countries might be due to geographic differences. It can be assured as there no major difference was observed in perinatal outcomes.

Evaluation of gestational age after delivery revealed 24% babies to be <10th centile. Out of these (7/24) 29.16% were in AFI <5 cm group and (17/24) 70.83% were in AFI 5-7 cm group. Majority of the babies whose baby weight was found to be <10th centile were of gestational age corresponding to 38 weeks. This might be explained by the fact that approaching term, amniotic fluid starts decreasing. Hence, more sonographic diagnosis of oligohydramnios, although idiopathic.

Present study is closer to that of Locatelli et al who found incidence of SGA in their study to be 23% among 341 babies born.⁷

Rossi C et al, found 10% incidence of SGA neonates in patients with oligohydramnios while 5% in controls.⁵

IUGR and Meconium stained liquor complicated course of 26% babies. Meconium stained liquor was found in total of 7% of babies, of them 1 succumbed to intrauterine death. No case of neonatal sepsis reported. Mothers of these babies didn't have any antenatal checkups.

The complaints of decreased fetal movements found in 5 patients out of which 4 delivered vaginally and only one by LSCS. One intrauterine dead baby was born in this group.

Bangal VB et al, found that neonatal morbidity was mainly due to meconium aspiration and neonatal sepsis.¹² High perinatal mortality (24%) was observed in the present study. In his study four babies (8%) developed meconium aspiration.3 delivered by LSCS and one by vaginal route. 2 babies died in neonatal period. Babies who died were of 37.5 weeks and 39.3 weeks of gestation with 1.3 kg and 2.5 kg respectively.

Melamed N et al, found incidence of meconium 1.9% in isolated oligohydramnios group and 4.3% in normal amniotic fluid volume group.¹⁰

Guin G et al, showed incidence of IUGR to be 27.6%.²

The complaints of loss of fetal movements were found in 8 patients. Out of which one went to NICU; rest 7 babies mother shifted. The baby who went to NICU was delivered vaginally. No fetal distress was found. In all 5 delivered vaginally while 3 had LSCS done.

Locatelli found NICU admission in AFI <5 cm group to be 7.6% and 10.1% in group with AFI >5 cm.⁷

Correlation between fetal outcome and geographic location. Still born baby belonged to urban population while intra uterine dead fetus was observed in mother belonging to rural population. Geographic location didn't amount to any significant differences however as NICU admissions were 3% in case of rural population and 4% in urban population.

Perinatal outcomes - 97% babies discharged in healthy condition. Total perinatal mortality was 3%. 1% stillborn, 1% intrauterine death and 1% expired after 7 days in NICU. Rest 6 babies who were admitted to NICU were mother shifted. Perinatal asphyxia, preterm, IUGR, meconium stained liquor and meconium aspiration syndrome lead to higher perinatal morbidity among the oligohydramnios newborns leading to higher rate of NICU admissions.

Perinatal outcome came out to be better in subjects having AFI 5-7 cm. In this group adverse perinatal outcome was observed in only 1.66% cases (1/60). While

in group with AFI <5 cm adverse perinatal outcome seen in 5% of cases. So, outcomes were worse in women with AFI <5 cm.

Chhabra et al, reported 7.2% incidence of perinatal mortality.¹³

Zhang J et al, reported 1.2% incidence of perinatal morbidity and 0% of mortality in idiopathic oligohydramnios group.³

Bangal VB et al, reported 92% live births and 8% still births. 16% babies died in neonatal period. The gross perinatal mortality was 24%.¹²

Maternal complications occurred in total 5 cases.2% of atonic post-partum haemorrhage cases and 2% cases who had traumatic PPH (cervix tear) had AFI <5 cm.1% case had postpartum haemorrhage belonging to group AFI 5-7 cm.

One patient had induction to delivery interval = 36 hours. Augmentation was instituted, delivered vaginally an alive male child of 2.5 kg.

IInd patient who had post-partum haemorrhage had LSCS, augmentation needed, induction - delivery interval being 10 hours, an alive male child of 2.5 kg.

IIIrd patient had LSCS done on account of failed induction+big baby+precious pregnancy. Induction-delivery interval being 11 hours, delivering an alive female child of 2.8 kg.

Patient with traumatic PPH (cervix tear) had delivered vaginally; babies weighing male of 4.2 kg and female of 2.25 kg. Induction - delivery interval being 16 hours and 8 hours respectively. So, one cervix tear might be explained by big baby. Cases of post-partum haemorrhage were managed with intrauterine packing. Gel was the mode of induction in all the cases.

The study conducted having predominantly rural population, who are not antenatally booked and more inclined towards vaginal delivery could be a limitation in our study. Also, at the time study was conducted AFI used to be the chief determinant, latest trends use DVP approach to quantify oligohydramnios.

CONCLUSION

The optimal management in isolated oligohydramnios varies according to facilities available with the obstetrician. Good fetal monitoring aids when giving induction in such cases.

Indeed, use of the AFI to predict fetal well-being is complicated by the subjective nature of its measurement. Our study shows that as sonographic findings is balanced with clinical judgement -perinatal morbidity and

mortality is not much significantly different. Indeed results in this study points towards favourable fetomaternal outcomes in labour induction with antenatal isolated oligohydramnios in India.

It is unlikely that a randomized trial will ever be feasible because withholding intervention would likely be unacceptable to most clinicians. Also, labour induction in >4 / >8 weeks oligohydramnios could be the one area to study where consensus could be reached.

Moreover, to arrive at a policy the required study size would be very large.

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Ethical approval: Not required

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