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A Clinical Study of Feto-Maternal Outcome in Pregnancies with Abnormal Amniotic Fluid Volume at A Tertiary Care Centre

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Abstract

INTRODUCTION: The amniotic fluid that surrounds the fetus serves several roles during pregnancy. It is an important indicator of fetal status and has become an integral part of fetal evaluation. Oligohydramnios is diagnosed when ultra-sonographically the AFI is ≤5cm/ 5th centile. It affects 3-5% of pregnancies. Polyhydramnios is diagnosed when the amniotic fluid index is≥25cm/ 95th centile affecting around 1% of all pregnancies. Assessment of amniotic fluid volume is a helpful tool in determining who is at risk for potentially adverse obstetric and perinatal outcome**.**

METHODS:78 singleton, non-anomalous, low risk pregnancies with AFI ≤ 5cm and ≥25cm with intact membranes and gestational age between 28 to term were included in this study. The AFI was measured using Phelans four quadrant technique. An AFI of 5-24cm is normal. AFI of <5cm was considered Oligohydramnios and ≥25cm was considered as polyhydramnios.

RESULTS: A total of 78 cases of isolated oligohydramnios and 17 cases of isolated polyhydramnios were assessed. In oligohydramnios group, 52.56% had vaginal delivery, 11.54% underwent elective LSCS and 33.33% had emergency LSCS. In polyhydramnios, 58.82% had vaginal delivery, 23.53% underwent elective LSCS where as 11.76 % had emergency LSCS.17.95% and 23.53% had meconium-stained liquor in oligohydramnios and polyhydramnios respectively. In oligohydramnios, 6.41% of the babies had APGAR <7at 5 min. 19.23% had birth weight <2.5kg. NICU admission was seen in 6.41% of babies. In polyhydramnios, 5.88% had APGAR < 7 at 5 min, 29.41% of babies were <2.5kg, 5.88% had NICU admission**.**

INTERPRETATION AND CONCLUSION: The clinical study was conducted to know the feto-maternal outcome in pregnancies with abnormal liquor volume. The study showed that isolated oligohydramnios and isolated polyhydramnios have no adverse maternal and perinatal outcome when properly monitored in a tertiary care center.

KEYWORDS: Abnormal liquor volume, isolated oligohydramnios, isolated polyhydramnios.

1. Introduction

Amniotic fluid serves an important role in providing a protective environment guarding fetus against various mechanical and biological injuries[1]. It also plays a role in supplying nutrients, maintaining adequate temperature within the uterus, preventing cord compression and facilitating optimal growth and movement.This fluid is composed of mainly water and solids which includes lipid, enzyme, hormones

and electrolytes.Amniotic fluid volume is the sum of inflow and outflow of fluid into the amniotic space.Early in the gestational period amniotic fluid is thought to be derived directly from the mother across amnion, fetal surface of placenta and fetal body surface. In later half, main source is fetal urine, lung liquid secretion; major routes of resorption are fetal swallowing and intramembranous pathways.[2]
Amniotic fluid volume does not change significantly from day to day during the course of pregnancy but it increases with growth of fetus reaching peak at 34 weeks and then decreases gradually.
It reflects the state of pregnancy and possible adverse complications. With the advent of real time ultrasonography assessment of amniotic fluid volume is possible resulting in early recognition of complications and possible interventions to be made.
Oligohydramnios is diagnosed when ultrasonographically the AFI is < =5cm/ 5 th centile, or a single deepest pocket of 2cm. The incidence being 1-5% of pregnancies. Etiologies include hypertensive disorders, uteroplacental insufficiency, dehydration etc[1]. Oligohydramnios is associated with high-risk adverse perinatal outcome like fetal distress, Small for gestational age (SGA) fetus, meconium staining, low APGAR and neonatal resuscitation/ NICU admission but is a poor predictor of neonatal outcomes.[2]
Oligohydramnios is often used as an indicator for delivery. Polyhydramnios is diagnosed when the deepest vertical pool of amniotic fluid is 8cm or greater, amniotic fluid index measured by Phelan's technique ≥25cm/ 95th percentile[3].The reported incidence varies from 0.2 -1.6 % of all pregnancies. The etiology of polyhydramnios is diverse and involves many maternal and fetal conditions including diabetes mellitus, congenital anomalies, isoimmunisation, multiple gestation and placental abnormalities. Half of the cases are found to be idiopathic[1] .A specific cause was identified in only 16% of the mild cases of polyhydramnios[3], 90% for moderate cases and 100% for severe cases. Premature labour complicates 40% of polyhydramnios patients[4].
Due to observed increase in cases of polyhydramnios and oligo hydramnios, this study estimates the effect of amniotic fluid disorders on fetal and maternal outcomes. Therefore, to analyse the distribution of possible causative factors and benefits of timely intervention in both oligohydramnios and polyhydramnios, we conducted this study at the Obstetrics and Gynaecology tertiary care unit of Jaipur Golden Hospital, Rohini, New Delhi, India.

AIMS and OBJECTIVES

1. To study the obstetric outcome in pregnancies with oligohydramnios and polyhydramnios.
2. To determine the fetal outcome in pregnancies complicated with oligohydramnios and polyhydramnios.
3. To study the distribution of possible factors which can possibly lead to polyhydramnios and oligohydramnios.

MATERIALS AND METHODS

The present study was conducted in the department of Obstetrics and Gynaecology, Jaipur Golden Hospital, Rohini, New Delhi.
Study design -Prospective Observational study
Selection criteria -Data was collected using a pretested proforma meeting the objectives of the study by convenience sampling method. The patients who had AFI of ≤ 5cm were considered as Oligohydramnios and ≥25cms were considered as polyhydramnios. Pregnancies of gestational age 28 weeks to term were included in the study.

Selection of cases was based on detailed history like duration of amenorrhea, fetal movements, past obstetric history, medical history regarding hypertension, diabetes and renal disease were recorded. On clinical examination presence of anemia, pedal edema, blood pressure were recorded. Routine examination of cardiovascular, respiratory system and Central nervous system was done.

On per abdomen examination the following points were noted:

- Symphysio-fundal height
- Presentation and position of the fetus
- Amount of liquor- normal, decreased or increased
- Fetal heart sounds

Clinically Per vaginal examination was done to note the Bishop's score and adequacy of pelvis for women beyond 37 weeks of gestational age.All the cases were subjected to routine blood investigations like blood grouping, Rh typing, HIV, HbsAg, Anti-HCV, VDRL, S.TSH, HPLC, GCT, urine routine and microscopy. Detailed ultrasound examination was done and AFI was measured using Phelan's four quadrant ultrasound technique.The uterus was arbitrarily divided into four quadrants by the umbilicus transversely and the linea nigra vertically. The largest vertical pocket free of fetal parts and umbilical cord loops in each quadrant was measured and AFI was taken as a sum of the four quadrants, in cm. An AFI of 5-24cm is normal. AFI of ≤ 5cm is considered Oligohydramnios and≥25cm is considered a polyhydramnios.Written informed consent was taken from the subjects. 78 cases of isolated oligohydramnios

and 17 cases of isolated polyhydramnios were studied during this period.

A. Inclusion Criteria:

- Pregnant women with gestational age between 28weeks to term with intact embranes.
- AFI≤ 5cm and AFI≥25cm as determined by ultrasonography.
- Singleton pregnancy.

B. Exclusion Criteria:

- Premature rupture of membranes
- Post term pregnancies
- Congenital anomalies of the fetus
- Pregnant females with co-morbidities like PIH,GDM etc.

The **Maternal outcomes** were assessed in terms of:

1. Incidence of Caeserean section
2. Preterm labor
3. Abruption
4. Induction of labor
5. Incidence of postpartum haemorrhage
6. Postpartum infections

The **Fetal outcomes** were assessed in terms of:

i. Prematurity
2. Acute respiratory distress syndrome
3. Neonatal Birth weight
4. APGAR scores at 1 and 5 min
5. Admission in NICU /No. of days of stay in NICU
6. Macrosomia

7. Perinatal mortality

OBSERVATIONS AND RESULTS

In this clinical study, 95 women with abnormal liquor volume, with gestational age 28 to term were analyzed for maternal and perinatal outcome. After taking detailed history and complete examination, AFI was obtained sonographically by Phelan's method. Women with AFI≤ 5 and AFI≥25cm without any other high risk factors i.e. isolated oligohydramnios and isolated polyhydramnios were followed up till delivery, pregnancy and perinatal outcomes were recorded.

TABLE -1 RESULTS

OUTCOME	OLIGOHYDRAMNIOS(N=78)	POLYHYDRAMNIOS(N=17)
1,Induction of labour		
• **Synto**	**24 (30.77%)**	**7(41.18%)**
• **PGE2**	**52(66.67%)**	**3(17.65%)**
2.Mode of delivery		
• **Vaginal Delivery**	**41(52.56%)**	**10(58.82%)**
• **Elective LSCS**	**9(11.4%)**	**4(23.53%)**
• **Emergency LSCS**	**26(33.3%)**	**2(11.76%)**
3.Meconium stained Liqour	**14(17.95%)**	**4(23.53%)**
4.APGAR		
• **< 7(1 MIN)**	**19(24.36%)**	**6(35.2%)**
• **<7(5 MIN)**	**5(6.5%)**	**1(5.88%)**
• **>7(1MIN)**	**59(75.65%)**	**11(64.7%)**
• **>7(MIN)**	**73 (93.59%)**	**16(94.12%)**
5.Birth weight		
<2.5 kg	**15(19.23%)**	**5(29.41%)**
>3.5(Macrosomia)	**1(1.28%)**	**4(23.53%)**
6.PNM	**0%**	**0%**
7.NICU Admission	**5(6.41%)**	**4(5.88%)**
8.Presentation (Breech)	**2(2.56%)**	**-**
9.Other complications		
• **Jaw deviation**	**1(1.28%)**	**-**
• **PPH**	**2(2.56%)**	**1(5.88%)**
• **Syndactyly**	**1(1.28%)**	**-**

PROFILE OF THE PATIENTS

In our study, maximum number of patients belonged to 20-24 years of group in both Oligohydramnios (66.67%) and polyhydramnios (58.82%). Also in our study the incidences of oligohydramnios and polyhydramnios was seen more in population belonging to rural areas may be due to lack of monitoring, nutrition and availability of health facilities during the course of pregnancy. Most of the patients we studied had completed there high school education. The distribution of the period of gestation (weeks) was similar between individuals diagnosed with Oligohydramnios and Polyhydramnios. Specifically, for Oligohydramnios, 11.54% of cases occurred before 37 weeks of gestation, 51.28% occurred Polyhydramnios, the respective percentages were 17.65%, 52.94%, and 29.41%.Booking status of our patients revealed that all the patients who presented with polyhydramnios were booked whereas 4(5.13%) patients who presented with oligohydramnios were unbooked. Also Oligohydramnios was more common in Primigravida (67.95%) whereas Polyhydramnios was more common in Multigravida (47.05%) as seen in our study.

COMPARISON OF OUTCOMES IN OLIGOHYDRAMNIOS

Table -2 Induction of labour in oligohydramnios

	Bachhav et al	**Present study**
Percentage of induction	30%	58.83%

Induction rate in our study was high as 95.24%. Similar high rate of induction was seen in other studies as well. In a study by Bachhav et al[5], labor was induced in 86% of women of which 61% underwent LSCS. Locatelli et al[6] evaluated 2000 uncomplicated pregnancies at term with singleton non malformed fetus with AFI< 5cm. Increased rate of induction and rates of CS for fetal distress was seen. Guin Gita et al[7] also reported higher incidences of labour induction which is also seen in this Study.

Table-3 Mode of delivery in oligohydramnios

TYPE OF DELIVERY	Bachhav et al (n=90)		Nazlima et al (n=78)		Lavanya et al (n=100)		PRESENT STUDY	
	N	%	N	%	N	%	N	%
Vaginal Delivery	30	34	22	28.20	47	47	41	52.56
LSCS	60	66	56	71.79	53	53	35	44.87
FORCEPS	-	-	-	-	-	-	2	2.56

In our study 52.56% patients delivered vaginally whereas 44.87 % delivered by LSCS among which 11,54% underwent elective LSCS and 33.33% by emergency LSCS .Bachhav et al[5], found that 66% of women with AFI< 5 underwent LSCS and 34% underwent vaginal delivery .Similar results were observed by Nazlima et al[8], where 71.79% underwent LSCS which quite higher than our study so considered significant, Similar results were observed by Lavanya et al[9], where 47% had normal vaginal

delivery and 53% were delivered by CS so it is non significant.Whereas Ghosh Runoo et al[10](2018) suggested that almost half of the patients delivered vaginally ,this was comparable to our study. They concluded that Oligohydramnios in obstetrics is a frequent occurrence and it points towards intensive surveillance and proper ante-natal and post-natal care. They also suggested that AFI assessed antepartum and intrapartum would help to identify women who need increased surveillance.

Table 4 -Em LSCS in oligohydramnios

Indication for Em LSCS	Umber A et Al	Guin Gita et al	Jindal et al	Present study
Fetal Distress	32%	42.8%	42%	30.77%

In our study fetal distress was assessed in the form of FHR variability, which was the indication for Emergency LSCS in (30.77%) of cases which is also suggested by Umber et al[11] (32%). This percentage was lower than Guin Gita et[7] and Jindal et al[12] percentages of Emergency LSCS due fetal distress in females with oligohydramnios which is considered as significant and depicts better monitoring facilities at a teritiary care center.

Table-5 Colour of liquor in oligohydramnios

Colour of Liquor	Madhurya et al	Present study
Meconium stained liquor	15%	17.95%

As our study showed, meconium stained liquor was observed in 17.95% of women, which was slightly more than study conducted by Madhurya et al[13] so it is non significant**.**

Table-6 Perinatal outcome in oligohydramnios

	Nazlima et al	Present study
APGAR <7 at 5min	26.9%	6.41%
<2.5 kg	65.3%	19.23%
>3.5 kg	-	1.28%
NICU admission	19.2%	6.41%
PNM	2.4%	0%

APGAR score < 7 in 5 mins

In our study APGAR score of babies born to oligohydramnios patients was 6.41% which was quite lower as compared to Nazlima et al[8] due to better facilities and infrastructure available at a tertiary care center. Ghosh Runoo et al[10](2018) suggested that APGAR score measured <7 at 5 minutes was in 43.6% babies. In Bacchav et al[5] 34% of babies had apgar ≤7.In all these studies there were more babies with APGAR score <7 which depict the importance of availability of better facilities in a a tertiary care center.

Low birth weight

Our study suggested that 19.23% of babies born to oligohydramnios patients were having birth weight <

2.5 % which is lesser than Umber et al[11] (36%) and Nazlima et al[8] (65.3%).In study done by Ghosh runoo et al[10] ,there was significant percentage of babies having birth weight lower than 2.5kg.

NICU Admissions

In our study NICU admission was seen in 6.41% of the babies, which is also comparable to umber et al[11] (7%) but is quite lesser than study done by Nazlima et al[8]

Perinatal mortality

In our study ,there were no perinatal mortality reported at our center due to better care of babies in a tertiary care center as compared to other studies which is considered quite significant which signifies the importance of timely intervention at a tertiary care center.

COMPARISON OF OUTCOMES IN POLYHYDRAMNIOS

Table-7-Induction of labour in polyhydramnios

	Bansal Lalita et al	**Present study**
Percentage of induction	30%	58.83%

In our study, 58.83 patients underwent induction of labour in our tertiary care center whereas in study done by Bansal Lalita et al[14] 30% of patients were induced which was quite significant**.**

TABLE-8 Mode of delivery in polyhydramnios

	Bansal Lalita et al	**Present study**
Normal vaginal Delivery	50%	58.82%
LSCS	50%	35.29%
Forceps	-	5.88%

In our study, we reported 58.82% normal vaginal delivery, 35.29% LSCS and 5.88 % instrumental delivery in patients with polyhydramnios whereas Bansal Lalita et al[14] showed higher birth by LSCS as compared to vaginal delivery in their center although no data was available for forceps delivery.

Table 9-PPH in polyhydramnios

	Guin Gita et al	**Present study**
PPH in delivery	**4.4%**	**5.88%**

In our study 5.88% of polyhydramnios subjects landed in PPH which was just slightly more t than study done by Guin Gita et al[7] where 4.4% landed in PPH.

Table 10 -Macrosomia in polyhydramnios

	Naseromer et al	**Present study**
Macrosomia > 4 kg	**20.3%**	**23.53%**

Our study reported that among patients with polyhydramnios, 23.53% gave birth to babies with birth we-

ight more than or equal to 4kg. It is comparable to as shown by Naser omer et al[15] thus pointing towards macrosomia as a significant finding in babies born to polyhydramnios patients.

Table 11-Preterm delivery in polyhydramnios

	Punithavati J et al	Present study
Preterm delivery	**30.63%**	**30.6%**

The incidence of preterm labour in patients with polyhydramnios was quite similar. In our study the incidence of preterm labour in patients with polyhydramnios was 30.6% which is almost same as study by Punithavati J et al[16] thus giving comparable results and thus is nonsignificant.

Table-12 Perinatal outcome in polyhydramnios

	Maliha sadaf et al	Present study
APGAR <7 at 5min	**6%**	**5.88%**
Malpresentation	**14%**	**0%**
NICU admission	**12%**	**5.88%**
PNM	**4%**	**0%**

APGAR score < 7 in 5 mins

In our study, babies born with APGAR <7 at 5 mins were 5.88% which was almost similar to as shown by Maliha sadaf et al[17].

Malpresentation

In our study there were no reported malpresentations, whereas Maliha sadaf showed 14% malpresentations which was quite significant.

NICU admission

This study reported 5.8% of NICU admissions which was quite lesser as compared to 12% of babies admitted in NICU in study done by Maliha sadaf et al.

PNM

Our study showed 0% perinatal mortality whereas 4% perinatal mortality was seen by Maliha sadaf et al21 in their study

CONCLUSION

Amniotic fluid assessment remains an important means of assessing fetal well-being. Given the daily use of the sonographic estimate of AFI in obstetric practice, it is important to continue to study and define abnormal volumes. Our study attempted to define risk of adverse pregnancy outcomes by defining the pregnancy as normal or at-risk and by stratifying the pregnancies based on AFVs.

We did not find increased risk of many adverse maternal and perinatal outcomes amongst atrisk pregnancies with abnormal fluid as anticipated; however, NICU admission was more frequent amongst pregnancies with Oligohydramnios whereas incidences of PPH was higher in women with polyhydramnios.

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