

## Title: Feto-Maternal Outcome in Pregnancies with Abnormal AFI.

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**Abstract:** Background: Evaluating feto-maternal outcome in pregnancies with abnormal liquor volume.

**Methods:** 70 pregnant subjects between 20 and 42 weeks of gestation, after thorough history and complete examination who were clinically suspected to have an abnormal amniotic fluid volume (oligohydramnios or polyhydramnios) were subjected to ultrasonographic (USG) assessment of amniotic fluid index. The subjects were closely monitored during pregnancy, labour and puerperium.

**Results:** Out of all the cases in our study with abnormal liquor volume 90% had oligohydramnios and 10 % had polyhydramnios. HDP (17.5), preterm labour (43.7 %) and IUGR (12.7% ) were associated with oligohydramnios. Fetal congenital anomalies (57.2%), diabetes mellitus (14.3%), PIH (14.3%), preterm labour (42.8 %) and Rh incompatibility (14.3%) were associated with polyhydramnios. The incidence of caesarean section, low birth weight and NICU admission was high in oligohydramnios subjects. Low APGAR score of < 7 at 1 minute was considerably high in both oligohydramnios and in polyhydramnios subjects. The incidence of IUD and macrosomia was significantly high in polyhydramnios group. The most common malformation in oligohydramnios group were renal anomalies. The most common aetiological factors for abnormal liquor volume were isolated oligohydramnios and isolated polyhydramnios.

**Conclusions:** A good clinical examination can pick up most subjects of abnormal liquor volume and can be confirmed ultrasonographically. Abnormal liquor volumes are associated with increased incidence of CMF maternal morbidity and adverse perinatal outcome.

**Keywords:** Aetiology, Congenital anomalies, IUD, NICU admission, Oligohydramnios, Polyhydramnios, Preterm labour.

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### I. Introduction

Amniotic fluid plays a vital role in the normal growth of the fetus and, promotes muscular-skeletal development and allows for easier fetal movement. It promotes fetal lung development, and provides an efficient barrier against ascending infections. It helps to maintain the fetal body temperature and plays a part in the homeostasis of fluid. It prevents compression of the umbilical cord and thus protects the fetus from vascular and nutritional compromise. The identification and evaluation of abnormal amniotic fluid is considered as an important component of antenatal assessment. Increased or decreased amniotic fluid volume is associated with foetal and maternal complications.

Oligohydramnios is found to be associated with increased frequency of maternal & fetal complications. It may be associated with uteroplacental insufficiency, preeclampsia, hypertension, diabetes, cardiac disease, congenital anomalies, idiopathic fetal growth restriction, fetal hypoxia etc. Fetal complications include cord compression and fetal distress, fetal pulmonary hypoplasia & stillbirth, fetal growth restriction, low APGAR score, NICU admission and fetal mortality. Maternal complications include prolonged labour due to inertia, induction of labour, increased incidence of operative intervention due to malpresentations and its associated morbidity and mortality.

Fetal conditions that are associated with polyhydramnios include major congenital anomalies (open neural tube defects, upper gastrointestinal tract obstruction or malformation etc.) and both the immunologic and non-immunologic forms of hydrops fetalis. Maternal medical conditions are also known to be associated with polyhydramnios and subsequent altered perinatal outcome (e.g. Diabetes mellitus). Preeclampsia, malpresentation, premature rupture of membrane, preterm labour and accidental haemorrhage are the very well known complications of polyhydramnios during pregnancy and cord prolapse, uterine inertia, retained placenta and postpartum haemorrhage are the expected complications of polyhydramnios during labour.

We report a clinical study of feto-maternal outcome in pregnancies with abnormal liquor volume.

### II. Materials and Methods

The present study was conducted in the Department of Obstetrics and Gynaecology, Maharishi Markendeshwar Institute of Medical Sciences and Research, Mullana, Ambala, from October 2012 to

September 2014. A detailed history was taken and thorough clinical examination was performed on the antenatal subjects between 20 and 42 weeks. The cases suspected to have abnormal liquor volume were confirmed by ultrasound scan assesment by means of AFI described by Phelan et al.<sup>12</sup> A total of 70 cases were diagnosed with abnormal liquor volume. All the subjects were closely monitored through pregnancy, labour and puerperium. Analysis was made regarding mode of delivery and perinatal outcome which constituted birth weight, APGAR at 1 and 5 minutes, NICU admissions and IUGR. Any congenital malformation not reported by ultrasound was recorded.

The data obtained was tabulated and analysed with appropriate statistical tools at the end of the study and conclusive evidence was derived.

### III. Results

We studied 70 cases with abnormal liquor volume with feto-maternal outcome. In our study the number of oligohydramnios cases was 63(90%) and 7(10%) of the subjects had polyhydramnios amongst patients with abnormal liquor volume. The maximum number of oligohydramnios cases 42(66.7%) belonged to the age group between 19 -26 years. While in polyhydramnios group majority of patients 4(57.1%) were in the age group of 27 – 35 years. ( Table-1) Most of the cases in oligohydramnios group were primigravida and in polyhydramnios group were multigravida. Majority of patients were nullipara in both oligohydramnios and polyhydramnios, contributing 42.9% and 57.1 % respectively. The maximum number of cases of oligohydramnios 36(55.5%) as well as of polyhydramnios 4(57.1%) were detected between 29-36 weeks. Most of the cases had mild oligohydramnios and mild polyhydramnios. Most common maternal condition associated with oligohydramnios was HDP contributing to 17.5%. Out of 7 cases of polyhydramnios, there was one case each of GDM, HDP and Rh incompatibility. Anaemia was found to be associated with both conditions as a co-morbid factor. In oligohydramnios group 43.7 % of patients had preterm labour and IUGR was associated with 12.7% of pregnancies. 42.8 % of patients in polyhydramnios group had preterm labour. The rate of caesarean section in oligohydramnios group was 38.1 % and in polyhydramnios group was 28.6 %. Most of the babies from oligohydramnios group had very low to low birth weight 36 (62 %) while, most of the babies from polyhydramnios group had macrosomia 3 (50%). APGAR score < 7 at 1 minute and at 5 minute in oligohydramnios group was observed in 41.4 % and 20.7 % cases respectively. In polyhydramnios group 50 % of cases had APGAR score < 7 at 1 minute and 5 minute. In our study, 12.1% of patients in oligohydramnios group and 33% of patients in polyhydramnios patients had IUD. NICU admission was required in 30( 58.8 %) of babies in oligohydramnios group and in 50% of babies in polyhydramnios group. Renal anomalies were most common anomaly associated with oligohydramnios. In the polyhydramnios group 2 cases had hydrops fetalis, diaphragmatic hernia and holoprosencephaly with microcephaly was diagnosed in one case each. Most common cause was isolated oligohydramnios (49%). HDP was second commonest factor contributing to 17.5% of patients. The other causes included IUGR (12.8%), fetal demise (12.1%), congenital malformation (7.9 %) and APH (7.9%). The etiologic factors of polyhydramnios varied and included maternal and fetal conditions such as congenital anomalies (28%), diabetes mellitus (14%), Rh - isoimmunisation (14%), but the most common cause of polyhydramnios was idiopathic in most cases (57.1%).

### IV. Tables

**Table -1age distribution**

Age (in years)	Oligohydramnios		Polyhydramnios	
	No. of patients	Percentage	No. of patients	Percentage
19-26	42	66.7	3	42.9
27-35	20	31.7	4	57.1
>35	1	1.6	0	0.0
Mean ± SD	25.8 ± 4.1		27.0 ± 1.8	

**Table – 2Distribution of patients according to Parity**

Parity	Oligohydramnios		Polyhydramnios	
	No. of patients	Percentage	No. of patients	Percentage
0	27	42.9	4	57.1
1	24	38.1	2	28.6
2	9	14.3	1	14.3
3	1	1.6	0	0.0
≥ 4	2	3.2	0	0.0
Mean ± SD	0.8 ± 1.0		0.6 ± 0.8	

**Table – 3 AFI at the time of detection and at delivery among patients with abnormal AFI**

AFI (in cm.)	Detection		Delivery	
	No. of patients	Percentage	No. of patients	Percentage
0-1	10	15.9	11	17.5
2-3	21	33.3	17	27.0
4-5	32	50.8	35	55.6
24-30	5	71.4	5	71.4
30.1-35	2	28.6	2	28.6
>35	0	0.0	0	0.0

**Table – 4 Associated Maternal Conditions**

Maternal condition	Oligohydramnios		Polyhydramnios	
	No. of patients	Percentage	No. of patients	Percentage
Anaemia	46	73.0	5	71.4
Hypertensive disorder of pregnancy, clampsia	11	17.5	1	14.3
GDM	0	0.0	1	14.3
Rh -ve factor	2	3.2	1	14.3

**Table – 5 Antenatal Complications**

Antenatal complications	Oligohydramnios		Polyhydramnios	
	No. of patients	Percentage	No. of patients	Percentage
No complications	25	40	1	14.3
Preterm labour	28	43.7	3	42.8
Intrauterine growth restrictions	8	12.8	0	0.0
Macrosomia	0	0.0	3	42.8
Antepartum haemorrhage	2	3.2	0	0.0

**Table – 6 Mode Of Delivery**

Outcome of pregnancy	Oligohydramnios		Polyhydramnios	
	No. of patients	Percentage	No. of patients	Percentage
Abortion	5	7.9	1	14.3
Caesarean delivery	24	38.1	2	28.6
Instrumental delivery	1	1.6	2	28.6
Normal delivery	33	52.4	2	28.6

**Table – 7 Distribution according to birth weight of baby**

Birth category	Birth weight (in Kg.)	Oligohydramnios		Polyhydramnios	
		No. of patients	Percentage	No. of patients	Percentage
Very low	<1.5	6	10.3	0	0.0
Low	1.5 – 2.4	30	51.7	1	16.7
Normal	2.5 – 3.4	21	38	2	33.3
Macrosomia	≥3.5	0	0	3	50.0

**Table – 8 Distribution of oligohydramnios patients according to congenital anomalies**

Congenital anomalies	No. of patients	Percentage
No congenital anomalies	58	92.1
Bilateral polycystic kidney	1	1.6
Dandy walker syndrome	1	1.6
Bilateral renal agenesis, Absent urinary bladder	1	1.6
Left Dysplastic Kidney	1	1.6
Spina bifida	1	1.6

**Table – 9 Distribution of Polyhydramnios subjects according to congenital anomalies**

Congenital anomalies	No. of patients	Percentage
No congenital anomaly	3	42.9
Diaphragmatic hernia	1	14.3
Holoprosencephaly with Microcephaly	1	14.3
Hydrops Fetalis	2	28.6

## V. Discussion

Abnormal liquor volume poses a challenge in obstetric management. This clinical study was conducted to ascertain the various etiological factors, mode of delivery, maternal and fetal outcome secondary to abnormal liquor volume.

In the present study the mean age of incidence of oligohydramnios was 25.8yrs and majority of the cases, 42.9% were nulliparous. A comparable mean age of presentation for oligohydramnios has been reported

by Bangal VB et al, Guin G et al and Asgharnia M et al of 22.8yrs,24.7yrs and 25.96yrs respectively. A higher frequency of oligohydramnios ,54% by Asgharnia M et al and 41.1% by Guin G et al was seen in nulliparous women. In the polyhydramnios group mean age of incidence was 27yrs which is comparable to the mean age of 25.39yrs as observed by Guin G et al. Majority of studies report a higher frequency of polyhydramnios in multiparous female,81.1% by Tashfeen K et al and 86.7% by Guin G et al but we found a higher incidence in nulliparous ,the small sample size of polyhydramnios group in our study can be the reason for this discrepancy. Most of the cases of oligohydramnios were found to be mild with AFI between 4 and 5, Bangal B et al and Sadovsky et al also observed a higher frequency of mild oligohydramnios. In the polyhydramnios group all the subjects had AFI <35. A lower frequency of severe polyhydramnios (AFI>35) has been reported by Tariq S et al and Guin G et al of 13.5% and 6.8% respectively.

It has been widely reported in the literature that most of the cases of oligohydramnios as well as polyhydramnios are idiopathic. We too found that 49% of cases of oligohydramnios were isolated oligohydramnios and 57.1% of polyhydramnios cases had no cause. Studies by Jagatia K et al and Zhang J et al support the high incidence of idiopathic oligohydramnios of 52% and 53% respectively. Chen KC et al observed that 60% of cases of polyhydramnios in their study were idiopathic. Hypertensive disorder of pregnancy was found in 17.5% of cases of oligohydramnios as also reported by Guin G et al 19.25% and Bangal B et al 16% respectively. The maternal conditions associated with polyhydramnios in our study were GDM, Rh negative blood group and HDP. In concordance to our study Guin G et al report a 20% incidence of GDM, 17.7% of HDP and 4.4% of Rh incompatibility. Tariq S et al observed GDM in 26.8% of cases and Rh isoimmunisation in 2.4% of cases.

In the present study 40% of subjects with oligohydramnios had no complication, 43.7% had preterm labour, 12.7% had IUGR AND 1.6% had APH. Asgharnia M et al too report a 40.4% incidence of preterm delivery. Guin G et al observed an incidence of 30% for PROM ,in the present study PROM was present in 28% of cases. An incidence comparable to our study for IUGR of 14.2% and 14% was reported by Guin G et al and Bangal B et al respectively. Asgharnia et al report a higher incidence of 26.6% of IUGR. A total of 4(42.8%) of cases of polyhydramnios landed in preterm labour and 3 had macrosomia. An incidence of 40% for preterm labour in polyhydramnios cases has been observed by Chavda RJ et al.

The mode of delivery was normal vaginal delivery in 52% of cases with oligohydramnios, 38.1% had cesarean section and 1.6% had instrumental delivery. Similar to our study Bangal B observed a rate of 56% of vaginal delivery and 35.25% for cesarean section. A lower rate of cesarean section is reported in polyhydramnios cases as compared to oligohydramnios in various studies, Guin G et al observed a rate of 22.2% for LSCS in polyhydramnios subjects against 42.8% cesarean section rate in cases with oligohydramnios. In our study 2(28.6%) cases of polyhydramnios had LSCS.

Abnormal liquor volume is known to be associated with increased perinatal mortality and morbidity. In the present study the incidence of IUD was 12.1% in oligohydramnios group and 33% in the polyhydramnios group. The birth weight was found to be low in 51.7% and very low in 10.3% of cases with oligohydramnios which is comparable to the incidence of 62% of low birth weight reported by Chate P et al. An APGAR of <7 at 1 minute was seen in 41.1% and 20.7% had APGAR <7 at 5 minutes. Mazor M et al too report a low APGAR at 5 minutes in 48.6% of babies. NICU admission was required in 58.8% of babies in oligohydramnios group and 50% of babies in polyhydramnios group. In study by Chate P et al 42% of babies in oligohydramnios required NICU admission while Asgharnia M et al observed that 14.9% of babies needed NICU admission, they conducted the study in subjects with borderline AFI which might be the reason for low NICU admissions. Akhtar S et al reported 55% rate of NICU admissions in polyhydramnios group.

Congenital anomaly was seen in 8% of cases with oligohydramnios, renal anomalies being the commonest. In accordance to our study Guin G et al reported an incidence of 8% for congenital anomalies and genitourinary anomalies were the commonest. The incidence of anomalies was higher in polyhydramnios cases ,42.9% of cases in this group had no congenital anomaly.

## **VI. Conclusion**

A good clinical examination can usually identify subjects with abnormal liquor volume. Every case of abnormal liquor volume needs careful antenatal evaluation, parental counselling, individualized decision regarding timing and mode of delivery. Continuous intrapartum fetal monitoring and good neonatal care are necessary for better perinatal outcome.

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