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A Clinical Study of Feto-Maternal Outcome in Pregnancies with Abnormal Liquor Volume

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ABSTRACT
Background
evaluating the maternal and perinatal outcome in pregnancies with abnormal liquor volume(Oligohydramnios and Polyhydramnios).
Materials and Methods
This prospective study was conducted in the department of Obstetrics and Gynaecology at SMGS Hospital,GMC Jammu from Nov 2019 to Oct 2020. Pregnant women with singleton, gestational age between 28-42 weeks with oligohydramnios (AFI≤5) and polyhydramnios (AFI≥25) were taken as study population.100 subjects with oligohydramnios and 100 with polyhydramnios were taken. They were subjected to detailed history, clinical examination and ultrasoundexamination, and were followed throughout pregnancy,labour and perpureium.
RESULTS
Most of the patients with abnormal liquor volume were diagnosed at term. Majority of oligohydramnios cases were primigravida and polyhydramnios cases were multigravida.In oligohydramnios group, Isolated oligohydramnios (37%) was the most common cause followed by IUGR(25%) and third being postdated pregnancy(21%).In polyhydramnios group, idiopathic polyhydramnios was the most common cause(57%), followed by GDM(20%) and congenital anomalies (20%).Incidence of congenital anomalies was higher in polyhydramnios group (20%) than oligohydramnios group (5%). In oligohydramnios group, 56% underwent cesarean section compared to 32% in polyhydramnios group.Acute fetal distress (60.7%) was the main indication for cesarean section in oligohydramnios group, while in polyhydramnios group malpresentations (25%) were the most common cause.Meconium stained liquor was most common in oligohydramnios group(58%).Major complications in polyhydramnios group were preterm labour and postpartum haemorrhage.In oligohydramnios group, the live birth rate was 92% and perinatal death rate was 8%. In polyhydramnios group, the alive and perinatal death rate were 82%, and 18% respectively.Majority of perinatal deaths in polyhydramnios group were due to lethal congenital anomalies.NICU admission was highest in oligohydramnios group (43%) than polyhydramnios group (26%).
CONCLUSION
A good clinical examination can usually identify subjects with abnormal liquor volume, which can be confirmed by examination of fluid compartment in ultrasound. Abnormal liquor volume is associated increased maternal morbidity and adverse perinatal outcome.
Keywords: Oligohydramnios, Polyhydramnios, Congenital anomalies, NICU admission.

I. INTRODUCTION

Just as our ancestors crawled out of ocean to life on land, we too, until birth, float in amniotic fluid.Commonly called as pregnant woman's water or waters (Latin; liquor amnii) amniotic fluid is the protective fluid contained by the amniotic sac ofpregnant female. It creates physical space for musculoskeletal development, promotes fetal lung development and helps to avert compression of the umbilical cord [1]. It is also known to possess bacteriostatic properties, protecting against potential infectious processes and a decrease in amniotic fluid volume may impair the gravid woman's ability to combat such infections [2].Amniotic fluid acts as a shock absorber, protecting the fetus from possible extraneous injury, maintains an even temperature and allows for growth and free movement of the fetus.

Amniotic fluid increases from approximately 30 ml at 10 weeks to 200ml by 16 weeks and reaches 800ml by the mid –third trimester [3,4]. Based on numerous studies, it has been determined that amniotic fluid volume increases steadily throughout pregnancy to a maximum of 400-1200 ml at 34-38 weeks[5]. Despite large fluxses of fluid between the various compartments near term (500-700 ml/day through

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urine; 200-450 ml/day through degluttition), the net increase of amniotic fluid is only 5-10 ml/ day in the third trimester. After 38 weeks, fluid volume declines by approximately 125 ml/week, to an average volume of 800 ml at 40 weeks[3]. After 43 weeks, this volume is reduced to 250ml[6]. In some instances, this reduction may possibly reflect a shift of cardiac output away from the kidneys as a result of a relative uteroplacental insufficiency. Post mature pregnancies (42 weeks) have marketedly decreased levels of amniotic fluid (100 ml to 200 ml)[1].The volume of amniotic fluid at any given time represents a balance between the structures producing it and those involved in the removal of amniotic fluid.

Oligohydramnios is a decreased amount of amniotic fluid affecting 3 to 5 % of pregnancies. It is diagnosed when ultrasonographically AFI is ≤ 5 cm / 5th percentile for the gestational age or a single deepest pocket of 2cm or less. Causes of oligohydramnios include Postdated pregnancy, uteroplacental insufficiency, congenital anomalies especially renal abnormalities. Oligohydramnios is associated with meconium passage, fetal heart rate abnormalities, low 5-minute APGAR score and increased NICU admissions.

Polyhydramnios is the condition of excessive liquor volume, complicating 1-3% of all pregnancies. It is diagnosed when DVP is 8cm or greater, AFI above 25 cm / 95th percentile for that gestational age. This clinical condition is associated with a high risk of poor pregnancy outcome[7,8].The eitiology of polyhydramnios is diverse and involves many maternal and fetal conditions including diabetes mellitus, congenital anomalies, isoimmunisation, multiple gestation and placental abnormalities. Half of cases are found to be idiopathic.

II. MATERIALS AND METHODS

This prospective study was carried out in postgraduate department of Obstetrics and Gynaecology at SMGS Hospital, GMC Jammu from Nov 2019 to Oct 2020. The antenatal population between 28 and 42 weeks was subjected to detailed history taking followed by complete physical examination. The cases suspected to have abnormal liquor volume were confirmed by ultrasound, by measurement of AFI using phelan's four quadrant technique.AFI of ≤ 5 cm is considered oligohydramnios and ≥ 25 cm is considered polyhydramnios.

Maternal outcome in terms of complications and mode of delivery, and perinatal outcome in terms of meconium staining,APGAR score at 1 min &5 min, birth weight and NICU admission were assessed.

This study was approved by the ethics committee of the institution.

STATISTICAL ANALYSIS

The data obtained was compiled and analysed using SPSS(20.0).Chi –square test, Fisher's exact test and t-test, whichever appropriate were used for statistical analysis. A P-value of less than 0.05 was considered statistically significant.

III. OBSERVATION AND RESULTS

The study was carried out on 200 subjects with abnormal liquor volume, including 100 subjects with oligohydramnios and 100 subjects with polyhydramnios. In both the groups,majority of cases were in the age group of 26-30 years. Most of the cases in oligohydramnios group were primigravida and in polyhydramnios group were multigravida (Table -1). The maximum number of cases of oligohydramnios group 58(58%) as well as of polyhydramnios group 62(62%) were detected after 37 weeks of gestation.

Table 1: Showing Parity of study patients

Parity	**Oligohydramnios**		**Polyhydramnios**		P-value
	No.	%	No.	%	
Primi	62	62%	51	51%	0.283

P1-P2	36	36%	47	47%	
≥ P3	2	2%	2	2%	
Total	100	100%	100	100%	

Most common maternal condition associated with oligohydramnios was hypertensive disorders of pregnancy(14%), followed by hypothyroidism, anemia, cholestatsis of pregnancy,APLA and seizure disorders.In polyhydramnios group, gestational diabetes mellitus(20%) was the most common maternal condition associatedfollowed by hypertensive disorders of pregnancy, hypothyroidism,Rh issoimmunization, anemia and T2DM (Table-2).

Table 2: Maternal conditions associated with abnormal liquor volume

Oligohydramnios			**Polyhydramnios**		
Maternal condition	No.	%	Maternal condition	No.	%
Hypertensive disorders of pregnancy	14	14%	GDM	20	20%
Hypothyroidism	7	7%	Hypertensive disorders of pregnancy	12	12%
Anemia	5	5%	Hypothyroidism	6	6%
Cholestasis of pregnancy	2	2%	Rh negative blood group	3	3%
APLA	1	1%	Cholestasis of pregnancy	2	2%
Seizure disorders	1	1%	Anemia	2	2%
			T2DM	1	1%
Total	30	30%	Total	46	46%

Renal anomalies were most common anomalies associated with oligohydramnios. In polyhydramnios group,congenital anomalies were noted in 20%, with hydrocephalus being the commonest. (Table-3)

TABLE 3:Congenital anomalies associated

Oligohydramnios			**Polyhydramnios**		
Congenital anomalies	No.	%	Congenital anomalies	No.	%
Microcephaly	1	1%	Hydrocephalus	6	6%
Hydronephrosis with hydroureter	1	1%	Anencephaly	5	5%
Multicystic dysplastic kidney	1	1%	Duodenal atresia	2	2%
CTEV	1	1%	Non immune hydrops	2	2%
Infantile PCKD	1	1%	Spina bifida	2	2%
			TOF	1	1%
			Intestinal atresia	1	1%
			Osteogenesis imperfect	1	1%
Total	5	5%	Total	20	20%

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In oligohydramnios group no cause was identifiable in majority of cases(37%),while IUGR was noted in 25% cases and 21% were associated with postdatism. In polyhydramnios group, 20% cases had GDM and 20% had congenital anomalies. The majority of cases were however idiopathic. Most of the cases had mild polyhydramnios(Table -4).

Table 4: Etiological factors

Oligohydramnios			**Polyhydramnios**		
Etiology	Number	%	Etiology	Number	%
Idiopathic	37	37%	Idiopathic	57	57%
IUGR	25	25%	GDM	20	20%
Postdated pregnancy	21	21%	Congenital anomalies	20	20%
Hypertensive disorders of pregnancy	12	12%	Rh negative blood group	3	3%
Congenital anomalies	5	5%			
Total	100	100%	Total	100	100%

In our study,59% and 30% subjects required induction of labour in oligohydramnios and polyhydramions group respectively(Table-5). In oligohydramnios group 56% underwent caesarean section while in polyhydramnios group 32% required caesarean section.

Table 5: Onset of labour among study patients

Onset of labour	**Oligohydramnios**		**Polyhydramnios**		P-value
	No.	%	No.	%	
Spontaneous	36	36%	64	64%	<0.001*
Induced	59	59%	30	30%	
Elective LSCS	5	5%	6	6%	
Total	100	100 %	100	100%	

60.7% of CS were done for acute fetal distress in oligohydramnios subjects,followed by 8.9% for CPD and failed induction each and 7.1% for NPOL. The major indication for CS in polyhydramnios group was malpresentations(25%)(Table-6).

Table 6: Indications for cesarean section

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Indications	Oligohydramnios		Polyhydramnios	
	No.	%	No.	%
AFD	34	60.7	7	21.9
CPD	5	8.9	6	18.8
FI	5	8.9	3	9.4
NPOL	4	7.1	2	6.3
Breech presentation	3	5.4	7	21.9
Previous LSCS	4	7.1	3	9.4
Oblique lie	1	1.8	1	3.1
Cord prolapsed	0	0.0	3	9.4
Total	56	100	32	100

In oligohydramnios group 58% had meconium-stained liquor compared to13% in polyhydramnios group. In oligohydramnios group, 92% babies were alive while in polyhydramnios group 82% babies were alive. (Table-7)

Table 7: Fetal outcome among study patients

Fetal outcome	Oligohydramnios		Polyhydramnios		P-value
	No.	%	No.	%	
Perinatal death	8	8%	18	18%	0.036*

Alive	92	92%	82	82%	
Total	100	100%	100	100%	

APGAR score below 7 at 5 minutes was found in 31%neonates in oligohydramnios group and 29% in polyhydramnios group.In oligohydramnios group 58% had low birth weight. In polyhydramnios grouponly 27% had low birth weight and 7% had macrosomia.NICUadmissions were reported in 43% neonates in the oligohydramnios group and 26% in polyhydramnios group.

IV. DISCUSSION

Numerous studies have been carried out to know the perinatal morbidity and mortality in pregnancies with abnormal liquor volume. Likewise, this study was conducted with an aim to find out the fetomaternal outcome in patients with abnormal liquor volume at our Department of Obstetrics and Gynaecology,S.M.G.S HOSPITAL.

In our study, out of 100 patients in oligohydramnios group 44% were in the age group of 26-30yrs and among 100 patients in polyhydramnios group 49% were in this age group. There was no significant difference in mean age of oligohydramnios (26.1±4.27 yrs) and polyhydramnios group (26.9±3.87 yrs).This is comparable with the study carried out by Bansal L et al in which mean age of oligohydramnios group was 26.2 years and that of polyhydramnios group was 26.8 years.

As per the parity distribution of our study, 50% of the cases in the oligohydramnios group were primigravida, which is comparable to the study carried by Jagatia k et alin which 52% of the cases were primigravida. Among the polyhydramnios subjects, majority were multigravida which is comparable to study by Guin G et aland study by Tashfeen K et al.Majority of women had gestational age >37 weeks both in oligohydramnios and polyhydramnios group.Instudy conducted by Ray P et al 73% subjects with oligohydramnios had gestational age between 37-40 weeks.Also majority of women were more than 37 weeks [50%] in study done by Gurung SD et al in pregnancies complicated with polyhydramnios.

In our study,oligohydramnios was associated with hypertensive disorder of pregnancy in 14% compared to 8% in Chate P et al study, 17.5% in kaur T et al study and 20% in Bansal L et al study. GDM was present in 20% which is similar to that found in Guin G et al study.In study conducted by Kaur T et al 14.3% subjects had GDM while in study done by Magann et al only 7% had GDM.

12% cases with polyhydramnios had hypertensive disorders which is comparable to 13% seen with Vaid et alstudy.In our study 3% were Rh negative, compared to Guin G et al study where 4.4% were Rh negative.

In oligohydramnios group, 5% of cases had congenital anomalies while in study done by Anil shetty et al5.8% had congenital anomalies, and in Kaur T et alstudy 8% had congenital anomalies. The most common anomalies noted were pertaining to Genitourinary system, which is comparable to Guin G et alstudy.

In our study 20% had congenital anomalies in polyhydramnios group while in study done by Gurung SD et al25% had congenital anomalies.In our study, Hydrocephalus [6%] was the most common anomaly noted followed by anencephaly [5%] which is comparable to study by Guin G et al.Non immune hydrops was present in 2% of cases in our study as compared 7% in study by Damato N et al.

In our study, 37% were isolated oligohydramnios with no identifiable cause as compared to 52% in study by Jagatia K et al.25% cases in our study were IUGR which is comparable to Anil Shetty et al.In our study, 12% were hypertensive disorders of pregnancy, compared to 17.5% in study by Kaur T et al and 8% in study by Chate P et al.

In polyhydramnios group, exact cause could not be detected in 57% of cases which is comparable to study by Brady et al.In our study, 20% subjects had GDM, which is similar to Guin G et al study [20%]. Study done by Idris et al had shown polyhydramnios among 18.8% pregnant ladies of gestational diabetes. Literature have shown the prevalence of polyhydramnios in gestational diabetes ranging from 8-20%.

In our study, 59% of the cases in oligohydramnios group were induced which is

comparable to 56.6% cases in study by Guin G et al. In study done by Bhattacharya R et al 57% subjects were induced and in study by Kumar A et al 54% patients were induced.In polyhydramnios group, 30% patients were induced which being similar to study by Bansal L et al while 13.6% were induced in study by Guin G et al.The cesarean section rate was higher in oligohydramnios group [56%] in our study which is comparable to 42.8% in study by Guin G et al and 44% in study by Kumar A et al.As per our study, 32% patients in polyhydramnios group underwent cesarean section which is comparable to 36% in study by Magann et al and 28.6% in study by Kaur T et al.

Most common indication for cesarean section in oligohydramnios group was acute fetal distress, which was noted in 60.7% cases.In study by Bhattacharya R et al 69% cesarean sections were due to acute fetal distress and in study by Jandial et al 42% cesarean sections were due to fetal distress.In polyhydramnios group, Malpresentations were the major indication for cesarean section in our study. In study by Shifana S et al 17.3% subjects had malpresentation.12% had preterm labour in our study which is comparable to 16.5% noted in study by Taskin S et al. In our study cord prolapse was noted in 4% of cases which is comparable to 4.4 % seen with study by Guin G et al.

In our study, 31% of babies had low 5 minute APGAR score in oligohydramnios group as compared to 23.7% in study by Chandra et aland20.7% in study by Kaur T et al.In polyhydramnios group, 29% babies had low 5 minute APGAR score in our study compared to 20% in study by Bansal L et al and 50% in study by Kaur T et al.In our study, with oligohydramnios subjects, 58% babies born were $\leq$ 2.5 kg which is comparable to 56% in study by Kumar A et al.Polyhydramnios group in our study delivered 66% babies with birth weight between 2.6- 4 kg compared to 80% in study by Bansal L et al.In our study, 43% babies were admitted in NICU in oligohydramnios group which is comparable to 46.15% in study by Chandra et al and 42% in study by Chate P et al.In polyhydramnios group, 26% babies were admitted to NICU in our study which is comparable to 30% in study by Bansal L et al. As per our study 21% babies were IUGR in oligohydramnios group compared to 14.2% in study by Kaur T et al. A study by Asgharnia et al reported an incidence of 26.6% of IUGR.

V. CONCLUSION

Amniotic fluid abnormalities are associated with increased perinatal morbidity. Oligohydramnios is associated with increased risk of fetal distress, meconium aspiration, LBW, respiratory distress and NICU admissions. Polyhydramnios is associated with increased risk ofpreterm delivery, cord prolapse, congenital malformations and fetal macrosomia.A careful and detailed antepartum evaluation should be done to identify the various eitiological factors, to individualize the decision regarding mode and timing of delivery, to get better foetal outcome as well as to avoid complications.

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