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POLYHYDRAMNIOS;
PERINATAL OUTCOMES IN EXPLAINED AND UNEXPLAINED POLYHYDRAMNIOS

Maryam Zulfiqar[1], M. Imran Hasan Khan[2], Salman Shakeel[3], Farhat Naz[4],

1. MBBS, FCPS (Gynae Obst)
Senior Registrar
Department of Gynae Obst Unit 2
Ameer ud Din Medical College,
PGMI, Lahore General Hospital,
Lahore.
2. MBBS, FCPS (Medicine), MRCP (UK),
MRCPS (Glasg), FRCP (Edn),
FRCP (Glasg), FRCP (London),
Associate Professor & Incharge
Department of Medicine
Medical Diabetes Endocrine and
Metabolic Center (DEMC) LGH,
Lahore
3. MBBS, MD
Resident,
Medical 2, LGH, Lahore
4. MBBS, FCPS Gynae Obs
Professor
Department of Gynae Obst Unit 2
Ameer ud Din Medical College,
PGMI,
Lahore General Hospital, Lahore.

Correspondence Address:
M. Imran Hasan Khan
Department of Medical Diabetes Endocrine and Metabolic Center (DEMC) LGH Lahore.

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ABSTRACT… Background: Polyhydramnios is a condition characterized by excessive amniotic fluid around the baby. The most widespread causes of severe Polyhydramnios are fetal anomalies often linked with a primary genetic anomaly. However, gestational diabetes, multiple pregnancies and idiopathic factors are commonly related with milder cases. So, we designed this study to see the association of polyhydramnios and perinatal outcome. **Objectives:** To compare the Perinatal outcomes in patients with explained and unexplained Polyhydramnios. **Study Design:** Cohort study. **Setting:** Obstetrics & Gynaecology Department and Diabetes clinic of Postgraduate Medical Institute, Lahore General Hospital. **Period:** 6 months From Jan 2014 to June 2014. **Material & Methods:** 300 females were included through Non probability purposive sampling. Informed consent and Demographic history was recorded. The patients were divided into two groups. Those having congenital anomalies and diabetes mellitus determined by ultrasonography and laboratory investigations were included in Group 'I' and patients with no detectable cause of polyhydramnios were included in Group 'II'. All the data was recorded in well-defined proforma. Data was entered and analyzed through SPSS 20. Relative risk was calculated to see any association between perinatal outcomes in both study groups. RR > 1 was considered as statistically significant. **Results:** The mean age of the patients was noted as 29.37±5.37 years. The mean gestational age was noted as 34.82±2.09 weeks. In this study, Macrosomia was observed in 60 (20%) cases whereas Malpresentation was observed in 51 (17%) cases. Malpresentation was observed in 51 patients out of which 14 (27.5%) were from explained Polyhydramnios and 37 (72.5%) were from unexplained Polyhydramnios group. Statistically there is significant difference between the study groups i.e. RR=3.181. Macrosomia was observed in 60 patients out of which 18 (30%) were from explained Polyhydramnios group and 42 (70%) were from unexplained Polyhydramnios group. Statistically there is significant difference between the study groups i.e. RR=2.852. **Conclusion:** It was concluded through results of this study that unexplained Polyhydramnios has more risk of developing adverse perinatal outcome.

Key words: Polyhydramnios, Amniotic Fluid, Gestational Age, Macrosomia, Malpresentation.

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INTRODUCTION

Amniotic fluid surrounding the fetus provides a shield appropriate for sufficient intrauterine growth and development of the fetus. The volume of normal amniotic fluid volume varies. The average volume increases with gestational age peaking at 800-1000 mL, which coincides with 36-37 weeks gestation. Polyhydramnios is referred as the amniotic fluid volume of >1000 ml. The adverse outcomes caused by polyhydramnios in pregnancies is approximately 2% and is quite significant to be addressed.[1]

Polyhydramnios is also defined as the deepest vertical pool of 8 cm or greater or an amniotic fluid index above 95th centile for gestational age.[2,3] The explanation of Polyhydramnios also includes an Amniotic Fluid Index (AFI) of 24 cm or greater or a single deepest pocket (SDP) of > 8cm.[4] Polyhydramnios can be divided into three groups according to its severity detected on maternal ultrasonography: mild (AFI 25-30cm or SDP of 8–11cm), moderate (AFI 30–35 cm or SDP of 11–15cm) and severe (AFI >35cm or SDP>15cm).[5] Polyhydramnios can arise as a consequence

of variety of fetomaternal and placental abnormalities. These consist of major congenital abnormalities of central nervous system, gastrointestinal system, cardiovascular and urogenital systems. The chromosomal mutations also account for their contribution in developing polyhydramnios. Other factors include multiple pregnancies, Rhesus isoimmunisation and gestational Diabetes. These all are included in explained polyhydramnios. However, in about two third of the cases with polyhydramnios, none of the reason being identified (idiopathic or unexplained polyhydramnios).[6]

Preterm labor and delivery are the important adverse events occurring in approximately 26% of mothers with polyhydramnios. Additional complications include premature rupture of membranes, pre PROM, placental abruption, cesarean delivery, postpartum hemorrhage, fetal malpresentations and significant perinatal mortality.[7,8,9,10,11]

A study revealed significantly higher incidence of birth weight >4000 gm in mild unexplained polyhydramnios group as compared to the explained polyhydramnios group (18.6% vs 8.6%) with (p value <0.05 which is statistically significant).[12]

Another study documented that the idiopathic polyhydramnios was not associated with an increased incidence of established perinatal outcomes like preterm births, small for gestational age, low birth weight, low APGAR score after 5 minutes of neonatal life, admissions of babies into NICUs and perinatal deaths. However, it was associated with significantly high rates of macrosomic babies, malpresentation and cesarean section induced deliveries.[13]

Another recent study reported the prevalence of macrosomia in unexplained and explained polyhydramnios is equal (4% vs. 4%) respectively (p value >0.05 statistically insignificant) and the incidence of fetal malpresentation in unexplained and explained polyhydramnios group is (24% vs. 14%) respectively (p value >0.05 statistically insignificant).[14] In another study there was 8(11.6%) malpresentation as compared to the control which is 4 (2.7%) (p-value= <0.05).[15]
The rationale of this study is to compare the frequency of fetal Malpresentation and macrosomia in explained and unexplained polyhydramnios. Although, there is a enormous literature available but there is a controversy in different studies regarding the incidence of macrosomia and fetal malpresentation in explained and unexplained polyhydramnios.[12,13,14]

So, this study was carried out to address these disputed outcomes finding out their incidence in both the groups and in larger patients group as compared to the previous studies.

OBJECTIVE

To compare the perinatal outcomes in patients with explained and unexplained polyhydramnios

MATERIALS AND METHODS

This was a cohort study and was conducted in Obstetrics & Gynaecology Department and Diabetes Clinic of Postgraduate Medical Institute, Lahore General Hospital, Lahore from January 2014 to June 2014 under Non probability purposive sampling. Total of 300 cases (150 cases in each group) were enrolled in this study using 80% power of study, 5% level of significance and expected percentage of macrosomia in unexplained and explained polyhydramnios and 11.6% vs. 2.7%.[15] Females with age 18-40 years and with gestational age >24 weeks were included in this study. Those who were not willing to participate or those planned to be delivered at another hospital were excluded.

They were categorized in two groups as: (Group I) Polyhydramnios occurring as a result of variety of fetometernal and placental abnormalities and assessed on obstetrical ultrasound) and Gestational Diabetics (GDM) at 24–28 weeks using a 75-g 2-hour oral glucose tolerance test (OGTT) and the following cut points: Fasting: ≥92 mg/dL, 1-hour: ≥180 mg/dL, and then 2-hour: ≥153 mg/dL.[16] and (Group II) Polyhydramnios not associated with congenital anomalies of the central nervous system or gastrointestinal tract, maternal diabetes and multiple gestations

assessed on obstetrical ultrasound.

Demographic history was recorded as Age, Parity, Gestational age and locality. Administrative permission from the concerned authorities was obtained. The patients were explained about the procedure and a written informed consent was taken. Information on maternal age and parity was obtained by researcher herself. Amniotic fluid volume of these patients was assessed ultrasonographically using the 4 quadrant method. Patients whose AFI was >24cm was diagnosed as having polyhydramnios. These patients were then advised to have detailed anomaly scan and whole day sugar profile to detect congenital anomalies and diabetes mellitus respectively. Outcome measures studied were macrosomia (>4.0kg) and fetal malpresentations at delivery.

Statistical analysis was done by using SPSS 20. Quantitative data like age (in years) was described as means and standard deviation. The qualitative data was include perinatal outcomes were described as frequency and percentage. Relative risk was calculated to see any association between perinatal outcomes in both study groups (explained and unexplained polyhydramnios). RR > 1 was considered as statistically significant.

RESULTS

300 cases (150 cases in each group) were enrolled with the mean age of 29.37±5.37 years. The minimum and maximum age of patients was 18 and 40 years respectively. (Table-I) The mean gestational age of the patients was noted as 34.82±2.09 weeks with minimum and maximum gestational ages of 29 and 38 weeks respectively. (Table-II) The mean gestational age in explained Polyhydramnios group was noted as 34.78±2.14 weeks and the mean gestational age in unexplained Polyhydramnios group was noted as 34.86±2.05 weeks. (Table-III) The malpresentation was observed in 51(17%) patients and was absent in 249(83%) patients. (Table-IV) The distribution about parity showed that 55(18.33%) patients were presented with zero parity, 49(16.33%) were presented with parity one, 86(28.67%) were with parity 2, 69(23%) with parity 3, 34(11.33%) were presented with parity 4 and only 7(2.33%) appeared with parity 7. (Figure-1) Macrosomia was observed in 60 (20%) patients whereas it was absent in 240(80%) patients. (Figure-2)

Malpresentation was observed in 51 patients in which 14 (9.3%) were from explained Polyhydramnios and 37 (24.7%) were from unexplained Polyhydramnios group, similarly 249 presented with absent Malpresentation in which 136 (90.7%) were from explained Polyhydramnios and 113 (75.3%) were from unexplained Polyhydramnios group. Statistically there is significant difference between the study groups i.e. RR=3.181. (Table-V) Macrosomia was observed in 60 patients in which 18 (36.0%) were from explained Polyhydramnios group and 42 (28.0%) were from unexplained Polyhydramnios group, similarly 240 presented with absent Macrosomia in which 132 (88.0%) were from explained Polyhydramnios and 108(72.0%) were from unexplained Polyhydramnios group. Statistically there is insignificant difference between the study groups i.e. RR=2.852 (Table-VI).

Age (Years)	N	300
	Mean	29.37
	SD	5.37
	Minimum	18.00
	Maximum	40.00

Table-I. Descriptive statistics of age in years

Gestational age (Weeks)	n	300
	Mean	34.82
	SD	2.09
	Minimum	29.00
	Maximum	38.00

Table-II. Descriptive statistics of Gestation age (weeks)

		Polyhydramnios	
		Explained	Unexplained
Gestational age (Weeks)	N	150	150
	Mean	34.78	34.86
	SD	2.14	2.05

Table-III. Descriptive statistics of Gestation age (weeks) in accordance with Polyhydramnios

		Frequency	Percent
Malpresentation	Present	51	17.0%
	Absent	249	83.0%
	Total	300	100.0%

Table-IV. Distribution about malpresentation of the patients

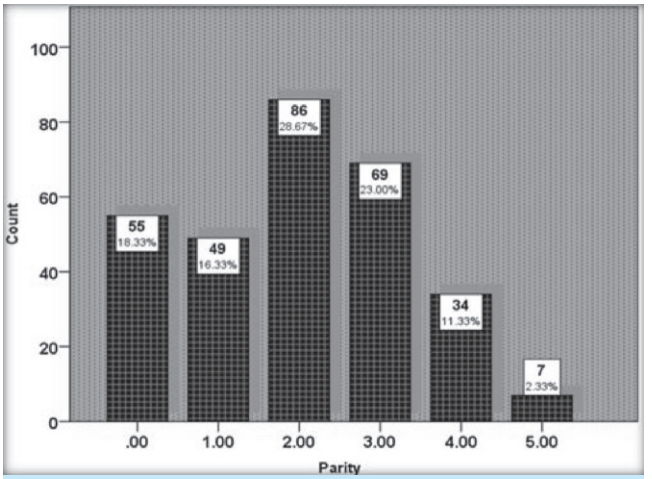

Figure-1. Distribution about parity of the patients

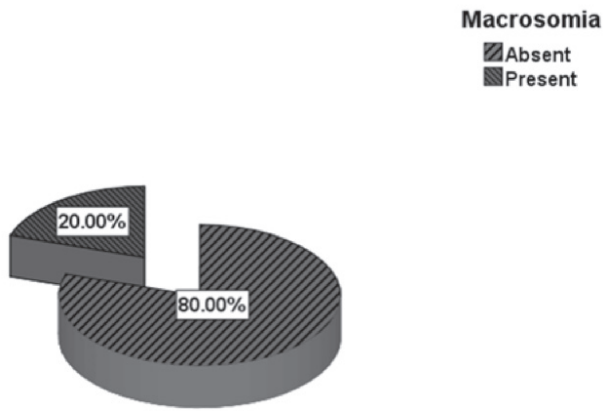

Figure-2. Distribution about Macrosomia of the patients

		Polyhydramnios		Total
		Explained	Un-explained	
Malpre-sentation	Present	14 (9.3%)	37 (24.7%)	51 (17.0%)
	Absent	136 (90.7%)	113 (75.3%)	249 (83.0%)
Total		150 (100%)	150 (100%)	300 (100%)

Table-V. Distribution about Malpresentation in accordance with Polyhydramnios

		Polyhydramnios		Total
		Explained	Un-explained	
Macro-somia	Present	18 (12.0%)	42 (28.0%)	60 (20.0%)
	Absent	132 (88.0%)	108 (72.0%)	240 (80.0%)
Total		150 (100%)	150 (100%)	300 (100%)

Table-VI. Distribution about Macrosomia in accordance with Polyhydramnios

DISCUSSION

Pregnancies complicated by polyhydramnios are of high threat needing thorough investigations. Major causes include gestational diabetes, congenital abnormalities, chromosomal mutations, iso-immunologic diseases, multiple gestations and idiopathic causes. Perinatal outcome appears to be good in cases where polyhydramnios is of mild to moderate scale and no established maternal or fetal source. While, significant maternal morbidity and perinatal mortality are reported with severe Polyhydramnios or fetal congenital anomalies.[3,5]

Our study was conducted in Obstetrics & Gynaecology Department of Postgraduate Medical Institute, Lahore General Hospital, Lahore to compare the perinatal outcomes in patients with explained and unexplained Polyhydramnios. We included 300 pregnant females with polyhydramnios with the mean age of 29.37±5.37 years. The mean gestational age of the females was 34.82±2.09 weeks. In this study, the malpresentation was observed in 51(17%) cases while Macrosomia was observed in 60 (20%) cases.

In females having explained Polyhydramnios, 14 (9.3%) had malpresentation while among females with unexplained Polyhydramnios, 37 (24.7%) had malpresentation. Statistically there is significant difference observed between the study groups and it was also observed that females with unexplained polyhydramnios had three time more risk of developing malpresentation as compared to females having explained polyhydramnios i.e. RR=3.181.

In females having explained Polyhydramnios, 18 (36.0%) had macrosomia while among females with unexplained Polyhydramnios, 42 (28.0%) had macrosomia. Statistically there is significant difference observed between the study groups and it was also observed that females with unexplained polyhydramnios had almost three time more risk of developing macrosomia as compared to females having explained polyhydramnios i.e. RR=2.852.

Whereas study conducted by Shruti Saralaya et al., reported that 16% of females with Polyhydramnios

have Malpresentations.[17] About 20% higher malpresentation was shown in study conducted by Panting et al.,[18] Volante et al., reported that patients with idiopathic Polyhydramnios had higher incidences of fetal malpresentations.[19] Golan et al., said that significantly increased rate ($p<0.05$) of maternal complications such as pregnancy induced hypertension, gestational diabetes, premature rupture of membranes, premature delivery, recurrent Urinary tract infections and fetal malpresentations was observed in polyhydramnios group.[20] According to Smith et al., mild unexplained polyhydramnios and control group with no Polyhydramnios have equal incidence of Premature delivery, intrapartum complications and neonatal depression.[12] Mazor et al found a higher rate association of gestational DM and fetal Malpresentation with Polyhydramnios.[21]

Malas M, et al concluded in their study that idiopathic polyhydramnios apart from the increased incidence of macrosomia, Malpresentation and Cesarean delivery does not seem to have adverse perinatal outcome.[22] They showed that polyhydramnios is more common in our community than what was shown in other studies.[23,24] However, similar to other previous studies, idiopathic polyhydramnios was of mild type (84%) and accounted for 67% of cases.[18] In our study Macrosomia was observed in 20% patients several previous studies are showing a high incidence of macrosomic Infants.[12,13,25,26] The reason for this association is not clear, since all patients in their study group were screened for gestational diabetes. Smith et al suggested that an increased fetal urine production due to greater fetal size, development of both polyhydramnios and macrosomia could be due to subclinical glucose intolerance.[12] Panting-Kemp demonstrated that increased incidence of Cesarean delivery in his study group was due to Malpresentation and macrosmia. However, Gonen et al did not find prevention of Cesarean section for cephalopelvic disproportion by early induction of labor.[27] Sohaey explained in his study that Idiopathic polyhydramnios is associated with Macrosomia and large-for-gestational-age babies independent of maternal diabetes.[28] A study revealed that the mild unexplained polyhydramnios group showed a significantly higher incidence of birth weight greater than 4000 g than did the explained polyhydramnios group (18.6% vs 8.6%) (p value <0.05 statistically significant).[12]

Maliha Sadaf and her company concluded in their study that idiopathic polyhydramnios does not seem to have adverse perinatal outcome while Explained polyhydramnios is associated with higher rates of perinatal complications and deaths. They reported the incidence of macrosomia in unexplained and explained polyhydramnios is equal (4% vs 4%) respectively (p value >0.05 statistically insignificant) and the incidence of fetal malpresentations in unexplained and explained polyhydramnios group is (24% vs 14%) respectively (p value >0.05 statistically insignificant).[14] Panting – Kemp A et al., carried out a study and found no significant low birth weight in association with Isolated Polyhydramnios in 151 singleton pregnancies.[13] Similarly Smith et al., also didn't find the increased incidence of low birth weight and Preterm deliveries in the Polyhydramnios group.[12] Dorleijn DM et al., noticed in group of Isolated Polyhydramnios, a higher rate of Preterm deliveries and Low Birth Weight babies.[7]

Kahnamoieeet al., concluded that polyhydramnios in late gestation carries a higher incidence of babies who are large for gestational age. This condition by itself is not associated with an increased risk of adverse perinatal outcomes.[29]

CONCLUSION

Thus it was revealed from results of our study that unexplained polyhydramnios can cause triple risk to fetal complications among pregnant females. So, it was concluded through results of this study that unexplained polyhydramnios has more risk of developing adverse perinatal outcome. Now in future we can develop strategy to manage females with unexplained polyhydramnios with proper management method so that they can be prevented from hazardous outcome.

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In three words I can sum up everything I've learned about life: It goes on.

– Robert Frost –

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Maryam Zulfiqar	Research idea, Complilation or Results, Write up of manuscript.	
2	M. Imran Hasan Khan	Supervision, Review of Literature and review of the manuscript.	
3	Salman Shakeel	Data collection, compilation of results, result writing, statistical analysis.	
4	Farhat Naz	Supervision, case selection, discussion writing.	