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FETO-MATERNAL OUTCOME IN SINGLETON PREGNANCIES WITH POLYHYDRAMNIOS: A CASE CONTROL STUDY

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ABSTRACT

Objectives - To study the fetal and maternal outcome, in pregnancies complicated by polyhydramnios with that of pregnancies having normal fluid volume.

Maternal and Methods

This prospective case control study was conducted on 100 patients with polyhydramnios and 100 pregnant women with normal fluid volume over a period of 18 months from April 2017 to September 2018.

Results

Out of 100 patients with AFI > 24, 12% had congenital anomalies, out of which GIT were maximum as compared to control group only 2%. The most common maternal complication in the study group was preterm labor, malpresentation, PROM, eclampsia, abruptio placenta, dyspnea, cord prolapse and atonic PPH, slightly more as compared to study group.

Gestational age at delivery in the study group was 37.6 weeks as compared to 38.2 weeks in control group. The study group had more number of labor inductions, LSCS, fetal distress, low 1 and 5 minute Apgar Score, NICU admissions, meconium aspiration, respiratory distress and perinatal deaths as compared to control group.

Conclusion

Polyhydramnios poses danger for both mother and baby, hence there is a need to have an anomaly scan at an earlier gestation and monthly amniotic fluid assessment from 20th week onward for diagnosis of polyhydramnios and timely intervention so as to reduce the maternal morbidity and perinatal morbidity and mortality.

KEYWORDS : Feto-maternal outcome, polyhydramnios, singleton pregnancies.

INTRODUCTION

Amniotic fluid is the protective liquid contained in the amniotic sac of a pregnant uterus associated with nutritive and diagnostic functions. Polyhydramnios develops as a consequence of disturbed equilibrium between production, fetal resorption and secretion of amniotic fluid . Polyhydramnios is defined as deepest vertical pool (DVP) more or equal than 8cm on ultrasound or Amniotic fluid index (AF1) of equal or more than 24cm or AF1 above the 95th percentile in singleton pregnancy . Increased value of MAP (maximal Amniotic pocket) > 8cm is the only criteria to diagnosed polyhydramnios in multiple pregnancies——. Incidence of polyhydramnios is approximately 1-2% in general population due to earlier diagnosis and better management of pregnancies with fetal congenital anomalies . The cause for polyhydramnios include maternal conditions (25%) such as diabetes, multiple gestation, infections; fetal conditions (35%) such as congenital anomalies, immune hydrops, chromosomal abnormalities, sacrococcygeal teratoma while in 40% cases, the cause is idiopathic where none of the etiology is found . Maternal complications are mostly attributed to uterine distension and include abdominal discomfort, uterine irritability, PPH and compromised respiratory function . Higher perinatal mortality is largely due to presence of congenital malformation followed by prematurity and hypoxic events . Therefore this study is aimed to determine the maternal and perinatal outcome in pregnancies with polyhydramnios.

Method-

This study was conducted in obstetrics and gynecology department at tertiary care hospital over a period of 18 months from April 2017 to September 2018. Study protocol was approved by institutional ethics committee. After detailed history of the patients and thorough physical examination, clinical diagnosis of polyhydramnios was confirmed by ultrasound after which they were included in the study and proforma was filled.

Inclusion criteria-
1)   Patients with AF1 > 24cm.
2)   Gestational age > 20 weeks.
3)   Singleton pregnancy.
4)   Patients giving informed consent to be part of the study.

Exclusion criteria-
1)   Multiple gestation.
2)   Gestational age < 20 weeks.
3)   Patients who refuse to give consent.
4)   Patients with comorbid condition likely to affect fetomaternal outcome such as maternal systemic illness

Study group comprised of 100 patients of polyhydramnios diagnosed with AF1>24cm. AF1 was measured by Phelan's technique by obtaining a sum of the vertical dimension of four imaginary cord and limbs free quadrant of the uterus. Control group comprised of women having at least 3 AF1 measurement ranging between 10-20 cm beginning from 20th week of gestation and matched with respect to age, parity and gestational age at delivery. Multiple gestation, infections, placental abnormalities, fetal hydrops and fetal anomalies if any were noted on ultrasound. Fetal echo was done to rule out congenital heart disease. All patient were divided into three groups based on the values of AFI as mild polyhydramnios (24-29.9cm), moderate AFI (30.34.9) and severe AF1 >35cm. These women were closely monitored throughout their antenatal, intrapartum and postpartum periods. Routine lab investigations were done like complete hemogram, blood group and Rh typing sickling, VDRL, oral glucose tolerance test, serum TSH, TORCH.

In cases with pregnancy more than 37 weeks, induction of labor or cesarean section was done (depending on obstetric indications). Complete labor record was made along with mode of delivery and duration. Complete physical examination of baby by obstetrician and pediatrician was done and recording of Apgar score and any anomalies found were noted.

These two groups were compared, considering some fetal and maternal variables including postpartum hemorrhage, placental abruption, birth weight, NICU admission, meconium staining, respiratory distress, fetal deaths, neonatal deaths, low 1 min and 5 min Apgar store, primary cesarean section and preterm delivery.

Statistical Analysis:-
At the end of study data was compiled and analyzed. Discrete (categorical) variables were compared by pearson chi square test

and for continuous variable student t-test was used. Significance of the results were checked at 95% confidence interval (CI) and p value < 0.05 was considered statistically significant. Data analysis was carried out using Stata Statistical software version 10/1/2011.

Observations and Result

In the present study 100 cases of polyhydramnios were studied and compared with 100 normal cases with normal AFI as control group. Both the groups were comparable on the basis of age, parity and gestational age at the time of delivery.

Median AFI in the case group was 26 cm with AFI value ranging between 25 – 37 cm. 92(92%) patients in the case group were having mild polyhydramnios, 4(4%) having moderate polyhydramnios and 4(4%) having severe polyhydramnios. In the control group we included patient with AFI between 10-20 cm and median AFI in the groups was 14 cm with AFI values ranging between 10-20 cm.

The mean maternal age was 27.63 ± 4.77 years (18-35 years) for study group and 27.47±4.58 years (18-36 years) for control group. Most of the cases were multigravida 61% for study group.

Table 1: Distribution of cases and controls according to Gestational age at delivery

Gestational Age at delivery (in weeks)	Cases					Control	
	No.	Percentage	Mild	Moderate	Severe	No.	Percentage
21-27	0	0%	0	0	0	0	0%
28-31	0	0%	0	0	0	0	0%
32-36	46	46%	39	3	4	34	34%
≥37	54	54%	53	1	0	66	66%
Total	100	100%	92	4	4	100	100%
Mean	37.6±1.77					38.21±2.15	

The gestational age at the time of delivery ranged from 33 to 40 weeks for case group and mean gestational age was 37.6 ± 1.77 weeks. The gestational age for delivery of control ranged from 36 to 40 weeks and mean gestational age was 38.21 ± 2.15 weeks (Table-1).

The study of gestational age at diagnosis showed that most 54% of the cases diagnosed with polyhydramnios were ≥ 37 weeks while 46% cases were between 32-36 weeks. Most (69%) cases of polyhydramnios was idiopathic, followed by GDM (17%) congenital anomalies (12%) and infections (2%) as a cause.

The analysis of congenital anomalies showed that congenital anomalies were seen in 12(12%) cases of polyhydramnios while anomalies were seen in 2(2%) cases in control group (Table-2). Cleft palate was seen in 4(4%) cases, cleft lip 1(1%) cases, duodenal atresia 1(1%), esophageal atresia 2(2%), diaphragmatic hernia 1(1%), trisomy 1(1%).

Table 2: Total no of normal and anomalous fetus

Fetus	Cases (n = 100)	Controls (n = 100)
Normal	88	98
Anomalous	12	2
P value	0.0055	

Table 3: Distribution of cases and controls according to Congenital Anomalies

Anomalies	Cases		Severity			Controls	
	No.	%	Mild No.	Moderate No.	Severe No.	No.	%
Cleft palate	4	4%	2	2		1	1%
Cleft lip	1	1%	1			1	1%
Esophageal Atresia	2	2%		1	1	0	0%
Duodenal Atresia	1	1%			1	0	0%
Diaphragmatic hernia	1	1%	1			0	0%
Anencephaly	2	2%			2	0	0%
Nonimmune Hydrops Fetalis	0	0%		1		0	0%
Spina bifida	0	0%				0	0%
Hydrocephalus	0	0%				0	0%
Congenital heart disease	0	0%				0	0%
Trisomy	1	1%				0	0%
No congenital anomaly	88	88%				98	98%
Total	100	100%	4	4	4	100	100%

All the 4(4%) cases of severe polyhydramnios was associated with congenital anomalies out of which 2(2%) cases had Anencephaly 1 each of esophageal atresia and duodenal atresia. All the 4(4%) cases of moderate polyhydramnios had congenital anomalies out of which 2 had cleft palate, one of esophageal atresia and one had trisomy (Table-3).

Table 4: Distribution of cases and controls according to maternal complications

Complications	Cases(n=100)	Control(n=100)
	Percentage	Percentage
Preterm Labour	46%	6%
Abruptio placenta	6%	3%
Premature rupture of membrane	9%	11%
Dyspnea	4%	0%
Post partum hemorrhage	10%	4%
Cord prolapse	4%	0%
Malpresentations	11%	9%
Eclampsia	7%	6%
Retained placenta	0%	0%
No maternal complications during delivery	39%	61%
Total	100%	100%

Maternal parameters, medical and obstetrics complications were studied. Maternal complications 61(61%) like preterm delivery, PROM, abruptio placenta, cesarean section due to fetal distress, malpresentation and cord prolapse were more than in the control group 39% (Table-4).

Table 5: Distribution of NICU admission of neonate in cases and controls

Perinatal outcome		Cases (n = 100)	Controls (n = 100)	P value
Meconium stained liquor	Yes	7	0	
	No	93	100	
Apgar score at 5 min	<7	27	9	0.009
	>7	73	91	
Non reassuring fetal heart rate	Yes	13	20	0.1823
	No	87	80	
Perinatal Death	Yes	18	10	0.1030
	No	82	90	
NICU admission	Yes	25	9	0.0025
	No	75	91	

In the polyhydramnios group the alive and perinatal death rate was 82% and 18% respectively. While in the control groups the alive and perinatal death rate was 90% and 10% respectively (p >0.05). 5min Apgar score of <7 was more 27(27%) in cases as compared to 9(9%) in control. Hence NICU transfer were more in polyhydramnios as compared to control groups (p<0.05) (Table-5).

Table 6: Distribution of cases and controls according to mode of delivery

Mode of Delivery	Cases (n=100)		Control(n=100)	
	No.	Percentage	No.	Percentage
Normal	38	38%	57	57%
LSCS	62	62%	43	43%
Operative	0	0%	0	0%

In the present study 62% cases of polyhydramnios delivered by cesarean section while 38% cases delivered vaginally. 57% control with normal fluid volume delivered vaginally while 43% had cesarean section.

DISCUSSIONS

Polyhydramnios in singleton pregnancies has generally been defined as greater than 2 litres of amniotic fluid within the gestational sac(9). In our study of total 100 patients of polyhydramnios diagnosis was confirmed using Amniotic fluid index of > 24cm by phelan's method. In older studies, hydramnios was reported to complicate 3.5% of pregnancies but a more recent study of population undergoing routine anomaly scanning found the incidence to be much lower 0-2%(5). In our study majority (61%) of the cases of polyhydramnios were multigravida. Various studies have found that polyhydramnios is more common in multigravida similar to our study (1, 10, 11). Lallar et al, Chen et al and Biggio et al found relationship between idiopathic polyhydramnios and rising maternal age and parity (1, 11, 12). In our study mean age at the diagnosis of polyhydramnios was 27.63 ± 4.77 year (range 18-35yr). Study by Vaid S et al showed 60% cases in the age groups of 20-30 years while Chiranjib Maji (2006) reported 98% cases in the age groups of 20-30 years(13, 14). Mild polyhydramnios was the commonest type (92%) in our study followed by (4%) moderate and (4%) severe. Soumini et al 2017 reported 92.4% cases with mild polyhydramnios in their study(15). Similar results were reported by Dashe et al Lazebnik et al and Pripaz et al in their studies (5, 16, 17). In our study mean gestational age at diagnosis of polyhydramnios was 36.55 ± 2.13 completed weeks with most 51% cases being diagnosed at gestational age of 37 weeks and above. In many studies, polyhydramnios was usually detected in third trimester (Gopchade et al 2018) and our findings are similar to these studies(18). Major cause of polyhydramnios include maternal diabetes, isoimmunisation disease, congenital abnormalities and multiple gestations. Therefore prenatal ultrasound follow up of polyhydramnios is justified and invasive management may be required. In the present study, etiological factors for polyhydramnios was idiopathic in 69% cases while 17% cases had GDM, 12% had fetal congenital anomalies and 2% cases had TORCH

infection. Hill et al reported in a study that nearly 70% of this pathology was idiopathic(19). Idiopathic polyhydramnios is described as hydramnios that is not related to congenital anomalies, maternal diabetes, isoimmunisation, fetal infection (CMV or toxoplasmosis) placental tumor or multiple gestation(1). In a large number of pregnancies polyhydramnios remain unexplained despite extensive prenatal assessment and this unexplained polyhydramnios has been associated with significant higher rates of malpresentations, macrosomia, primary cesarean delivery and increased rate of perinatal mortality(20). Studies by Rajgire et al and Naser Amir Mustafa Malas reported etiological factor as idiopathic in 65.1 % cases and 60.7% cases respectively(21, 22). In our study etiology was idiopathic in most of the cases of mild polyhydramnios while it was congenital anomalies in all cases of moderate and severe polyhydramnios. In the present study most (54%) cases with polyhydramnios and 66% controls with normal AFI delivered at gestational age of ≥37 weeks. There was no statistical association between gestational age at delivery and polyhydramnios. All the cases of severe polyhydramnios delivered at gestational age between 32 - 36 weeks. Thus it was found that severe polyhydramnios had early onset of labor as compared to mild polyhydramnios. One of the major complication associated with polyhydramnios is preterm deliveries i.e. 20% of patient. Similarly, Phelan et al found an increased incidence of pre-term delivery rate in patients with polyhydramnios(23). In our study preterm deliveries was seen in 46% of cases of polyhydramnios and 34% of controls (p>0.05). There are conflicting reports in the literature with regard to the association of polyhydramnios with preterm delivery. In a study by Soumini et al preterm delivery was 6% lesser than in control group but in some studies by Odibo et al found increase in preterm rate(15, 24). Other maternal complications in polyhydramnios were premature rupture of membrane (9%), abruptio placenta (6%), cord prolapse (4%), eclampsia (7%) and postpartum hemorrhage (10%) as compared to abruptio (3%), PROM (11%), eclampsia (6%) and postpartum hemorrhage (4%) in control group. There was no maternal mortality in any case. Thus, preterm labor and malpresentation were high similar to the study done by Raghuwanshi et al (25). In the present study fetal anomalies were present in 12% cases of polyhydramnios and 2% controls with normal fluid volume. Touboul et al 2007 reported that and aneuploidy is present in 10% fetus with sonographic anomalies and in 1% when the ultrasound examination is considered to be normal(20). Cardwell et al 2014 reported that in persistent polyhydramnios the prevalence of aneuploidy is increased (10 to 20%) compared with polyhydramnios with spontaneous resolution(26).There is insufficient evidence in the literature for induction of labor for polyhydramnios alone. However induction of labor is indicated when polyhydramnios is a part of clinical picture such as uncontrolled maternal diabetes or associated with other of obstetric condition such as prolonged pregnancy, maternal hypertension etc. In the present study most (62%) cases of polyhydramnios were delivered by LSCS as compared to 43% control with normal fluid volume. The common indication for LSCS was fetal distress (20%), malpresentation, GDM, cord prolapse eclampsia, CPD. Polyhydramnios is associated with higher fetal loss rate of upto 41% which increases to 60% if the fetus has coexistent structural anomalies. In the present study the perinatal death was 18% in polyhydramnios while perinatal death was 10% in control group (p>0.05). In a study by Anisa Fawad, et al 73.68% babies delivered alive while 26.32% were still born, which is nearly comparable to our study. In the present study, 5 minute apgar score < 7 was more 27(27%) in cases as compared to 9(9%) in controls. Similar result was reported by Rajoria L et al. They reported low APGAR scores at birth in 20% neonates in case group and 10% neonates in control group(27). In the present study NICU admissions were 25% in cases and 9 % in controls (p<0.05). Taskin et al reported NICU admission of 9.8% in cases and 5.9% in controls(28). Tehila et al reported NICU admission of 14.4% in cases and 24.7% in controls(29) while Tajinder et al reported 50% of NICU admissions of neonates of polyhydramnios(30).

Conclusion

Polyhydramnios increases the incidence of induction of labor, caesarian section, preterm labor, congenital anomalies and perinatal deaths. Hence polyhydramnios poses danger for both mother and baby. Anomaly scan is required at an earlier gestation and monthly amniotic fluid assessment from 20th week onward for diagnosis of polyhydramnios for timely intervention so as to reduce maternal morbidity and perinatal morbidity and mortality.

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