

USG Detected Prevalence of Polyhydramnios and Its Maternal Outcome in Singleton Pregnancy- A Prospective Study

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Abstract: Polyhydramnios is an important obstetric complication with increased maternal morbidity. Undoubtedly, ultrasound is the best means to diagnose polyhydramnios USG has revolutionized the process of assessment of amniotic fluid thus becoming an integral part of fetal surveillance. In a low resource health facility as India with poor coverage of antenatal care and malnutrition it still becomes more important to screen pregnancies for such high risk factors. To determine the incidence and to assess the maternal outcome in patients diagnosed to have polyhydramnios in singleton pregnancies. The present study was conducted in Gauhati Medical College for a period of one year from July 2017 to June 2018. All the patients were identified as having polyhydramnios using Largest pocket diameter method. The incidence of polyhydramnios in singleton pregnancy during the study period was 1.04 %. Majority of cases (76.61%) were mild, 14.03% moderate and 9.36 % severe polyhydramnios. Most common etiology was found to be idiopathic 69% followed by congenital anomalies 19.8% and Diabetes Mellitus 10.52% Out of 171 cases, 9 case was an abortion out of which 8 was induced due to fetal anomaly, 37 cases had preterm vaginal deliveries, 59 cases had full term vaginal deliveries, 66 cases had cesarean section. The most common maternal complication encountered was preterm labour and the most common malpresentations was breech. The study gives us the understanding of the impact of polyhydramnios on maternal outcome.

Keywords: Amniotic Fluid, Congenital Anomaly, Maternal, Polyhydramnios, Pregnancy.

INTRODUCTION

Polyhydramnios is defined as the accumulation of excess of amniotic fluid. Ultrasonographically, it is defined as the deepest vertical pool of 8 cm or greater or an amniotic fluid index above 95th centile for gestational age [1]. Clinically, it is defined as excessive accumulation of liquor amnii causing discomfort to the patient and/ or when an imaging help is needed to substantiate the clinical diagnosis of the lie and presentation of the fetus [2].

The risk factors for polyhydramnios include diverse maternal and fetal conditions, such as gestational diabetes mellitus, placental abnormalities, isoimmunization, multiple gestation, congenital anomalies, and chromosomal aberrations [3]. Pre-eclampsia malpresentation, premature rupture of membrane, preterm labour and accidental haemorrhage are the very well-known complications during pregnancy and cord prolapse, uterine inertia, retained placenta and postpartum haemorrhage are the expected complications of polyhydramnios during labour. So by

diagnosing these cases as early as possible, we can prevent these maternal complications [4].

Amniotic fluid volume assessment done by ultrasound is relatively accurate than other methods of assessment. Recent data have shown that age specific percentiles are not more helpful than constant cut off values used either with the single pocket or AFI method [5]. The height of the deepest pocket and the AFI are objective semi quantitative measurements of the amniotic fluid.

The purpose of the study is to determine the incidence of polyhydramnios in our hospital set-up and the relationship between amniotic fluid index or deepest vertical pocket diameter as estimated by ultrasound studies and its maternal outcome.

AIM AND OBJECTIVES

To determine the incidence and to assess the maternal outcome in patients diagnosed to have polyhydramnios in singleton pregnancies

METHODOLOGY

This was a prospective observational study conducted in the department of Obstetrics and Gynecology, Gauhati Medical College And Hospital for a period of 1 year. All pregnant women between 16-41 weeks of gestation attending OPD or seen in emergency labor room detected to have polyhydramnios clinically were evaluated by ultrasound fulfilling the following inclusion and exclusion criteria.

Inclusion Criteria

- Pregnancy associated with excess of amniotic fluid ie. if the largest pocket diameter (LPD) greater than or equal to 8 cm or if the amniotic fluid index (AFI) is greater than the 95th percentile for the gestational age.
- Irrespective of age and parity.
- Second and third trimester pregnancy (from 16th weeks of gestation onwards)

Exclusion Criteria

- Pregnancy associated with over distended abdomen other than hydramnios.
- Pregnancy with huge ovarian cyst.
- Ascites.
- Cardiac and Renal disease.
- Multiple pregnancy.
- First trimester.

With the patient lying supine, using a curvilinear or sector transducer amniotic fluid pockets were measured. Uterus is arbitrarily divided into four quadrants using the maternal sagittal

midline vertically and a transverse line approximately half way between pubic symphysis and upper edge of uterine fundus. The deepest obstructed and clear pocket of amniotic fluid is visualised and image frozen. Maximum vertical pocket of amniotic fluid of 8cm or more were taken as polyhydramnios.

In the present study, amniotic fluid volume was measured by using *Largest Pocket Diameter (LPD)/ Single Deepest Pocket Diameter (SDP)* and the cases were divided into mild, moderate and severe [6, 7].

- Mild: single deepest pocket at 8- <12 cm
- Moderate: single deepest pocket at 12- <16 cm
- severe: single deepest pocket \geq 16 cm

Each patient Included in the study was subjected to relevant investigations like blood group and Rh typing and blood sugar to identify the possible aetiology of hydramnios. These patients were followed up during pregnancy and labour. The mode and gestational age of delivery were based on obstetric criteria. The maternal outcome was studied in the patients irrespective of the mode of delivery.

RESULTS

In our prospective observational study, total number of deliveries in singleton pregnancy was 16507 of which total number of polyhydramnios fulfilling the inclusion and exclusion criteria was 171. The incidence of polyhydramnios in singleton pregnancy during the study period was 1.04 %.

Table-1: Clinical profile of pregnant mothers with polyhydramnios

Variable	No(percentage) n=171	Variable	No(%) n=171
Age		Gravida	
<=20	28(16.38%)	Primi	70(41%)
21-25	51(29.82%)	Multi	101(59%)
26-30	59(34.5%)		
31-35	28(16.38%)	Types	
>=35	5(2.92%)	Acute	13(7.6%)
Gestational Age		Chronic	158(92.4%)
16-< 24	7(4.09%)	Severity	
24-<28	5(2.92%)	Mild	131 (76.61%)
28-<33	23(13.45%)	Moderate	24 (14.03%)
33-<37	35(20.47%)	Severe	16 (9.36%)
>=37	101(59.07%)	Maternal conditions	
Etiology		Anaemia	63(36.8%)
Idiopathic	118(69%)	Gestational hypertension	27(15.8%)
Fetal anomalies	34(19.88%)	Diabetes mellitus	18(10.52%)
Diabetes mellitus	18(10.52%)	Rh isoimmunization	1(0.58%)
Rh-isoimmunization	1(0.58%)	Pre-eclampsia	4(2.34%)
Chorioangioma of placenta	1(0.58%)		

The age of the patients included ranged from 18-41 years, the commonest age group found being 26-30 years (34.5%). Majority (59%) of the patients were multigravidas. Majority (59.07%) of the patients were diagnosed with polyhydramnios at >37 weeks. There was a statistically significant correlation between the gestational age at diagnosis and the severity of polyhydramnios. Majority of the cases diagnosed at term were mild polyhydramnios, whereas a higher percentage of cases of severe polyhydramnios were found among the cases detected before 33 weeks of gestation.

In the present study, majority of cases (76.61%) were mild polyhydramnios, 14.03% cases were moderate and 9.36% cases were severe.

In our study, most common etiology of polyhydramnios was found to be idiopathic. (69% cases) followed by congenital fetal anomalies in 34 (19.88%) cases and diabetes Mellitus in 18 (10.52%) cases. The common associated maternal factors were anaemia in 63 cases, gestation hypertension in 27 cases and diabetes mellitus in 18 cases. Others include pre-eclampsia in 4 cases, and Rh isoimmunization in 1 case.

Table-2: Maternal conditions associated with polyhydramnios

Maternal complications		No. Of cases	(%)
Preterm labour		27	15.8
PPROM		5	2.9
Premature rupture of membranes (PROM)		3	1.8
Malposition	Right occipito-posterior position	2	1.2
	Face presentation	1	0.6
Malpresentation	Compound presentation	1	0.6
	Transverse lie with hand prolapse	1	0.6
	Unstable lie	3	1.8
	Breech presentation	4	2.3
Cephalopelvic disproportion (CPD)		18	10.5
Cord prolapse		1	0.6
Abruptio Placentae		1	0.6

The above table shows the maternal complications during pregnancy. The most common complication was preterm labour (15.8%). Other complications were CPD, PPROM, premature rupture

of membranes, malposition, malpresentation, cord prolapse and abruptio placentae. 3(1.8%) patients had post-partum hemorrhage (PPH), 2 cases following term vaginal delivery and 1 case following cesarean section.

Table-3: Mode of delivery

Types			No. Cases
Abortion	Induced		8
	Spontaneous		1
Vaginal	Preterm	Induced	5
		Spontaneous	32
	Fullterm	Induced	23
		Spontaneous	36
Caesarean section			66
Total			171

From the above table it was observed that out of 9 cases of abortion, 8 were induced (MTP) because of congenital anomalies of fetuses of which 2 were missed abortion.

37 cases were preterm vaginal delivery, out of which 5 cases were induced because of intrauterine fetal death and all of these babies were having congenital anomalies.

It was also observed from the above table that out of 59 cases of fullterm vaginal deliveries, 2 cases were delivered following outlet forceps and 4 cases

were delivered following vacuum extraction. Of these 59 cases, 23 cases were delivered following induction of labour because of intrauterine fetal death (1 case), postdated pregnancy (2 cases), premature rupture of membranes (2 case), pre-eclampsia (2 cases) and gestational HTN (16 cases).

66 cases underwent cesarean section. Indications being fetal distress, CPD, unstable lie, compound presentation, previous cesarean section, placenta praevia and prolonged labour. Out of these 66 patients, 3 cases were having fetal congenital anomalies

with previous history of cesarean section along with other obstetrical and medical complication.

DISCUSSION

Polyhydramnios is one of the common disorders among pregnancies. Recognition of polyhydramnios is of benefit as it allows identification of pregnancies that may be at increased risk of adverse outcomes. Once polyhydramnios is identified, patients need a thorough evaluation as it is associated with an increased frequency of both maternal and fetal complications [8]. The etiology of polyhydramnios is diverse, involving both maternal and fetal causes. The causes according to the literature include idiopathic origin, multiple gestation, maternal diabetes mellitus, isoimmunization, and fetal structural and chromosomal anomalies [9-12].

In present study a total number of 171 cases of polyhydramnios fulfilling the inclusion and exclusion criteria were taken for the study, to ascertain the various etiological factors, maternal complications and outcome. The diagnosis of polyhydramnios was done by ultrasound using Largest pocket diameter (LPD) method.

The incidence of polyhydramnios in singleton pregnancy during the study period was 1.04 % which was comparable to study conducted by Biggio J. R *et al.*, [13] who found the incidence to be 1% in 370 patients with singleton pregnancies.

In the study, majority i.e. 34.5% of cases were in the age group of 26-30 years. The minimum age was found to be 18 years and maximum as 41 years. Similarly, Fawad A *et al.*, [14] reported higher incidence in the age group 26-30 years. Chourasia S *et al.*, [15] reported highest number of patient of polyhydramnios (47%) in the age group of 21-25 years. In contrast, Akram H *et al.*, [16] and Saadia *et al.*, [17] reported higher incidence in the older age group.

In the present study majority of the cases 59% were multigravida and 41% were primigravida. Fawad A *et al.*, [14] and Chourasia S *et al.*, [15] reported even higher percentage of cases in multigravida. In our study, 6 cases (3.51%) were between 16 - < 24weeks, 7 cases (4.09%) were between 24 - < 28 weeks, 23 cases (13.45%) were between 28 - < 33 weeks, 35 cases (20.47%) were between 33 - < 37 weeks and in maximum number of the cases (59.07 %) polyhydramnios were diagnosed at term (≥ 37 weeks). Samyukta G *et al.*, [18] and Chourasia S *et al.*, [15] reported detection of 46% and 66% of cases at ≥ 37 weeks of gestation respectively. Rajgire A A *et al.*, [19] and Akram H *et al.*, [16] reported even higher percentage (90% and 83% respectively) of cases being detected at term.

Majority of the cases (76.61%) had mild polyhydramnios, 14.03% had moderate polyhydramnios while 9.36% had severe polyhydramnios. Comparable to our study, other studies too reported majority of the cases as mild polyhydramnios.

Table-4: The comparison between the etiology of polyhydramnios in various studies

Etiology	Present Study	Hill LM <i>et al.</i> ,	Tashfeen K <i>et al.</i> ,	Rajgire AA <i>et a.</i> , [19]
Idiopathic	118 (69%)	67%	76.8%	65.1%
Foetal anomalies	34 (19.88%)	12.7%	8.2%	26.6%
Diabetes mellitus	18 (10.52%)	14.7%	15.3%	8.3%
Rh-isoimmunization	1 (0.58%)	1%		6.6%
Chorioangioma of placenta	1 (0.58%)			

In all the above studies including the present study, majority of the cases were idiopathic and second most common etiology was found to be congenital anomalies. In the present study, fetal anomalies were found in 34 (19.88 %) cases. The association between diabetes and polyhydramnios is well known. A commonly supported theory is that increased amniotic fluid volume in diabetic pregnancies could be a result of maternal hyperglycemia which, in turn, produces fetal hyperglycemia & osmotic diuresis. In the present study, diabetes Mellitus was found in 10.52% (18 cases) which is comparable to Rajgire AA *et al.*, [19]. Rh isoimmunization was present in 1 (0.58%) case while Hill L. M *et al.*, [20] also reported 1% case of Rh isoimmunizations in their study. Placental chorioangioma occurred in 1 patient (0.58%), who had a preterm delivery and the baby died on the second day.

Desmedt EJ *et al.*, [21] reported 0.4% of placental chorioangioma.

In the present study 63 cases (36.8%) were associated with *anemia*. This observation can be explained by the high prevalence of anemia in our country, especially in the North-East population. Compared to present study, Rajgire AA *et al.*, [19] and Chourasia S *et al.*, [15] reported lesser incidence whereas Samyukta G *et al.*, [18] reported higher prevalence of anemia in their study. In the present study *gestational HTN* was present in 27 (15.8%) cases which is comparable to 17.7% reported by Chavda RJ *et al.*, [22]. Diabetes mellitus was associated with 18 (10.52%) cases in our study, which is comparable to the incidence reported by Rajgire AA *et al.*, [19]. Comparatively Chourasia S *et al.*, [15] and Samyukta G

et al., [18] reported lesser incidence (1.9% and 5% respectively), while Chavda RJ *et al.*, [22] reported higher incidence (20%) of diabetes. In the present study Pre-eclampsia was associated with 4 (2.34%) cases, comparable to Chourasia S *et al.*, [15] (2.9%). Higher incidence of pre-eclampsia was reported by Samyukta G *et al.*, [18] (14%) and Rajgire AA *et al.*, [19] (16.6%).

Preterm labour and Cephalopelvic disproportion were the most common complication in the study, present in 15.8% and 10.5% cases each. Similar to our study, Meena *et al.*, [23] reported a higher incidence of preterm labour and CPD.PPROM and PROM occurred in 2.9% and 1.8% cases in the present study. Similarly Samyukta G *et al.*, [18] reported 2.5% incidence of PPROM. Chourasia S *et al.*, [15], Meena N *et al.*, [23] and Rajgire AA *et al.*, [19] reported 5.6%, 3%, 5% incidence of PROM respectively. In our study 1 (0.6%) patient developed Abruptio Placentae, though a higher percentage (4.7%) is reported by Chourasia S *et al.*, [15]. Malposition and Malpresentation were present in 1.8% and 5.26% of cases. Our study is comparable to Meena N *et al.*, [23] who reported 3% and 4% cases of malposition and malpresentation respectively. 13 (1.8%) cases were associated with PPH, in the comparison; Chourasia S *et al.*, [15], Rajgire AA *et al.*, [19] and Samyukta G *et al.*, [18] reported 2.9%, 3.3% and 1.25% of PPH respectively.

The mode of delivery is another matter of debate in patients with polyhydramnios. Some authors reported high cesarean section rates but some others did not; however, overall incidence in the literature varies between 22% and 35% [24]. In the present study 66 (38.6%) cases underwent *cesarean section*, which is higher than in normal pregnancy and very well compares with 40% in a study by Akhter S *et al.*, [25]. Biqqio JR *et al.*, [13] reported three times higher rates for cesarean rate in women with hydramnios compared with controls (47.0% versus 16.4%; $P < .001$). Most common indication for cesarean section in the present study were CPD, placenta praevia, malpresentations, previous cesarean section, fetal distress and prolonged labour. 28 (16.4%) cases had induced vaginal deliveries. 9 cases (5.26%) were abortion, out of which 8 (4.68%) cases were induced on the basis of congenital anomalies of fetus and 1 anomalous fetus had spontaneous abortion. Meena N *et al.*, [23] reported induction rate of 18%, while S. Vaid *et al.*, [26] in their study reported induction rate of 16%. In the study conducted by Gaur S *et al.*, [27] 73% cases delivered vaginally, out of which 15% cases were induced due to various reasons like IUFD, anencephaly, Rh isoimmunisation. 27% cases under went LSCS due to cold prolapse, previous LSCS with scar tenderness, fetal distress, hydrocephalous, macrosomia, contracted pelvis.

CONCLUSION

Polyhydramnios is a common obstetric condition with a high incidence of both maternal and perinatal morbidity and mortality. The outcome of pregnancies complicated by polyhydramnios varies according to the severity and underlying etiology. Possible complications include preterm labor, premature rupture of membranes (PROM), CPD, fetal malposition and malpresentation, umbilical cord prolapse, postpartum uterine atony and high risk of operative deliveries with consequent risk of emergency anesthesia and surgery. We conclude highlighting the importance of early diagnosis, mostly with ultrasound, to allow for timely intervention and to improve maternal outcome

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