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Original Research Article

An observational study aiming to evaluate maternal and fetal outcomes of pregnant women having polyhydramnios in a tertiary care center

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ABSTRACT

Background: Aim of the study was to determine the effect of polyhydramnios in pregnancies that are more than or equal to 28 weeks on fetal outcome, maternal obstetrics complications and also to study the causes behind polyhydramnios.

Methods: A cross sectional retrospective and prospective observational research took place in Department of Obstetrics and Gynaecology of the Institute a tertiary care center on sample size of 90 cases in 3 years between January 2021 to January 2024.

Results: A significant association was found between amniotic fluid index (AFI) levels, gestational age, birth weight, APGAR scores at birth and fetal outcomes (p=0.001).

Conclusions: Early identification and management of pregnancies those with abnormal AFI levels are crucial for improving neonatal outcomes. Comprehensive antenatal care that includes regular monitoring of AFI, gestational age, antenatal care profile and fetal growth parameters, along with timely medical interventions, can help reduce adverse outcomes.

Keywords: Polyhydramnios, Deep vertical pockets, AFI, Congenital malformations

INTRODUCTION

Polyhydramnios is diagnosed with an excessive amounts of the amniotic fluid, identified through ultrasonography that could be measured by deepest vertical pocket (DVP) of more than or equal to 8 cm or an amniotic fluid index (AFI) of more than or equal to 24 cm, or an AFI more than 95th percentile for the corresponding gestational age. The condition results from an imbalance in production, absorption, and secretion of the amniotic fluid .The occurrence of polyhydramnios is reported in 1% to 2% of pregnancies, although some studies show a broader range of 0.2% to 3.9%.[1] It is often associated with complications like preterm labour leading to preterm birth, premature rupture of the membranes, and fetal anomalies, and careful monitoring is essential for managing these conditions and their effects on pregnancy outcomes.[1] Polyhydramnios is usually detected through per-abdominal examination, where the uterus may appear larger than expected as compared to gestational age. It may also be identified during ultrasound, either as part of a routine fetal survey or in response to other pregnancy-related concerns that need an evaluation of amniotic fluid levels or fetal growth. Clinically, polyhydramnios is recognized either through the subjective judgment of increased amniotic fluid during an ultrasound or by specific sonographic measurements. The two most commonly used sonographic measurements indicating excess amniotic fluid are AFI of more than or equal to 24 cm or a single deepest pocket (SDP) of more than or equal to 8 cm.[2] Increasing severity of polyhydramnios has correlation with an increase in risk of perinatal mortality and congenital malformations. Up to 31% of pregnancies having severe polyhydramnios (AFI ≥35 cm) are associated with high congenital malformations like the central nervous system, cardiac, or gastrointestinal malformations.[3]

METHODS

Study type

A cross sectional retrospective and prospective observational study design was employed as the data collection was done at a point of time both retrospectively and prospectively to get an adequate amount of sample size. 90 cases were studied over a span of 3 years.

Study place and study period

The study was done at Department of Obstetrics and Gynaecology of Seth G. S. Medical College and KEM Hospital, Mumbai between January 2021 to January 2024.

Selection criteria

Study population consisted of all the singleton pregnancies with 28 weeks or more than 28 weeks of gestational age with polyhydramnios registered or unregistered i.e. referred to our institute with AFI more than 24 cm or single deepest pocket more than 8 cm at the time of diagnosis and those who have complete data available in a retrospective sample. Poor follow up patients and Patient who has undergone hemodialysis during pregnancy due to medical renal causes were not included in the study.

Procedure

Primary objective was to determine the effect of polyhydramnios in pregnancies more than or equal to 28 weeks on the fetal outcome and the effect of polyhydramnios in pregnancies more than or equal to 28 weeks on the maternal obstetrics complications. Secondary objective was to study the causes of polyhydramnios. The research was conducted at the Seth G. S. Medical College, KEM Hospital Mumbai a tertiary care health center of the patients coming to obstetrics and gynaecology outpatient department, emergency receiving room, labour room. Sequential history and examination was recorded. Some parts of the study sample were collected retrospectively and some prospectively to get adequate study samples. A cross sectional retrospective study included the records of all the women admitted with polyhydramnios at 28 weeks or more of gestational age between January 2021 to December 2022 and the fetal and maternal outcome was recorded from the case sheets of the patients. These data were collected from the patient's case sheet records so informed consent was not taken in samples of retrospective study, rather waiver of consent was raised. Another part of study included the cross sectional prospective study in which study sample subjects were recruited from outpatient department, emergency receiving room, labour room who were at or beyond 28 week of gestation and AFI more than or equal to 24 cm and were followed up till delivery and post-delivery. Consent was taken in case the patients who were followed up prospectively to observe the outcome in the language they best understand. However patient information and individual characteristics were not disclosed. For the purpose of above study as well as patient care, frequency of antenatal care visit was done 2 weekly from 28 weeks onwards till 36 weeks of gestation and then after weekly till delivery.

Ethical approval

The analysis was commenced after obtaining the permission from the Institutional Ethics Committee and due permission from the review board and the Head of Department of Obstetrics and Gynaecology. All the outcomes and causes to be studied as primary and secondary objectives were recorded in excel sheets for result analysis.

Statistical analysis

Cross-sectional observational study was done, where samples were collected both retrospectively as well as prospectively to get adequate sample subjects as number of pregnant female fulfilling this criteria was very less according to the last 3 years data of our institute (i.e. 0.2% to 1%), as well as from previous Indian and International research studies (prevalence is 1% to 2%).[1] So we included all the pregnant females who were fulfilling our study criteria , and this method is known as "complete enumeration technique" in term of statistics.[4,5] From the last 3 years record of our institute, amongst the confinement of 6000, the pregnant females fulfilling the study criteria was approximately 30 cases per year. So, considering the prevalence of 0.5% of total confinement of a year i.e. approximately 6000 per year, 30 sample subjects were studied per year. All the cases fulfilling the study criteria from the record of January 21 to December 22 were 60 cases which were studied retrospectively, and all the cases from January 23 to January 24 were studied prospectively which were 30 cases in a year, so total 90 cases were studied in duration of 3 years. All the data analysis was conducted with the help of statistical packages for social science version (SPSS) and descriptive variables including mean, proportion and standard deviation. Independent sample t-test for quantitative variables and chi square for the qualitative variables were used.

RESULTS

Table 1 gives the overall summary of study parameters. Mild polyhydramnios was the predominant presentation. Most patients delivered at term with spontaneous labor. Idiopathic etiology was most common. Vaginal delivery was the primary mode. Preterm labor was the leading maternal complication. The majority of neonates had favorable outcomes, though NICU admissions and perinatal mortality were notable.

Table 2 shows the distribution of AFI severity. The majority of cases had mild polyhydramnios (76.7%), followed by moderate (16.7%) and severe (6.7%). A

statistically significant association was observed between AFI severity and fetal outcome (p=0.001). The incidence of adverse fetal outcomes increased progressively with AFI severity, reaching 66.7% in severe cases.

Table 1: Demographic and clinical characteristics (n=90).

Parameters	Number (N)	Percentage (%)
Gestational age (weeks)		
28-32	12	13.3
32-36	16	17.8
37-40	52	57.8
≥40	10	11.1
Mean gestational age (weeks)		
37.91±3.32	-	-
Onset of labour		
Spontaneous	72	80
Induced	18	20
Type of delivery		
NVD	67	74
LSCS	23	25.6
Gestation at delivery		
Term	62	68.9
Preterm	28	31.1
NICU admission		
Yes	17	18.9
No	73	81.1

Table 2: Distribution of AFI and fetal outcomes.

AFI category	AFI range	Number (%)	Adverse outcome (%)
Mild	24-30	76.7	10.1
Moderate	31-35	16.7	20.0
Severe	>35	6.7	66.7

Table 3 shows APGAR score versus fetal outcome. There was a strong statistically significant association between APGAR scores and fetal outcomes at both 1 and 5 minutes (p=0.000). Lower APGAR scores (≤7) were strongly linked to adverse outcomes, whereas higher scores predicted favorable survival.

Table 3: APGAR score - distribution and association with outcomes.

Time (minutes)	APGAR score	Number (%)	Association
1	≤7	25.6	Significant
	>7	74.4	Favourable outcome
5	≤7	24.4	Significant
	>7	75.6	Favourable outcome

The most common presenting complaint was leaking per vaginum (47.8%), followed by abdominal pain (43.3%). Other symptoms such as shortness of breath (5.6%) and rare complaints (bleeding PV, decreased fetal movement, abdominal tightness) were infrequent. The data indicates that PROM-like symptoms and uterine overdistension are predominant clinical presentations in Table 4.

Table 4: Presenting complaints.

Complaints	Number (N)	Percentage (%)
Leaking PV	42	47.8
Pain abdomen	39	43.3
Shortness of breath	5	5.6
Abdomen tightness	1	1.1
Bleeding PV	1	1.1
Decreased fetal movement	1	1.1

Figure 1 shows the distribution of cases based on underlying associated cause for polyhydramnios.

Idiopathic cases constituted the majority (55.6%), indicating no identifiable cause in more than half of patients. Fetal congenital anomalies (27.8%) were the most common identifiable cause. Gestational diabetes mellitus (12.2%) was a significant maternal contributor. Isoimmunization (4.4%) was the least common cause.

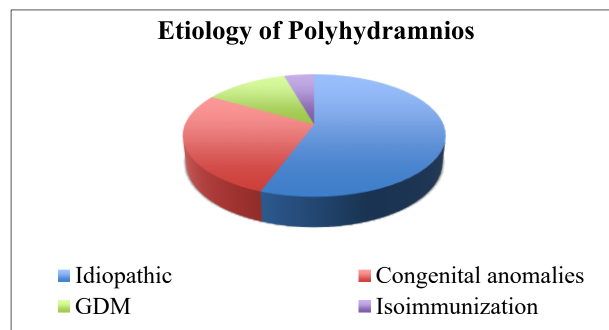

Figure 1: Distribution of cases based on underlying associated cause for polyhydramnios.

Figure 2 shows mode of delivery and indications for LSCS. Normal vaginal delivery (74.4%) was the most common mode of delivery. LSCS was required in 25.6% of cases. The leading indication for LSCS was fetal distress (26.1%), followed by previous LSCS (21.7%) and malpresentation (oblique lie – 17.4%). Less common indications included non-progress of labor, CPD, compound presentation, and cord prolapse.

Figure 3 shows maternal complications in cases of polyhydramnios. Preterm labor (31.1%) was the most frequent complication. Other notable complications included meconium-stained liquor (10%), malpresentation (7.8%), and fetal distress (6.7%). Serious complications such as abruptio placentae (5.6%) and PPH (4.4%) were also observed. Cord prolapse/presentation (3.3%) was the least common complication.

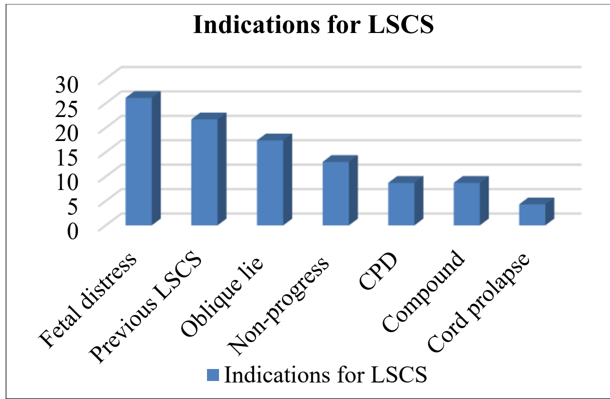

Figure 2: Distribution of indications for caesarean sections in cases of polyhydramnios.

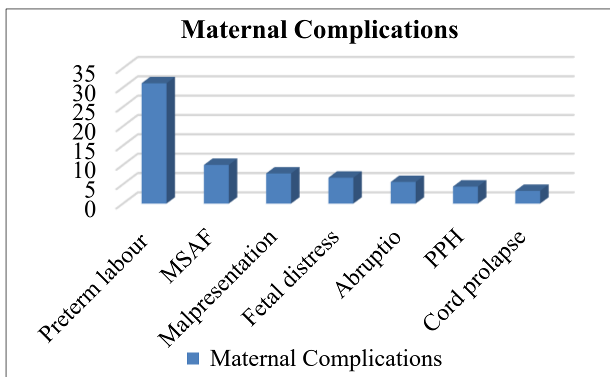

Figure 3: Distribution of maternal obstetrics complications in cases of polyhydramnios.

Figure 4 shows the fetal outcome in cases of polyhydramnios. Live birth rate was high (84.4%). Adverse outcomes included neonatal death (7.8%), IUFD (5.6%), and stillbirth (3.3%). Overall, despite a good survival rate, polyhydramnios is associated with significant perinatal mortality.

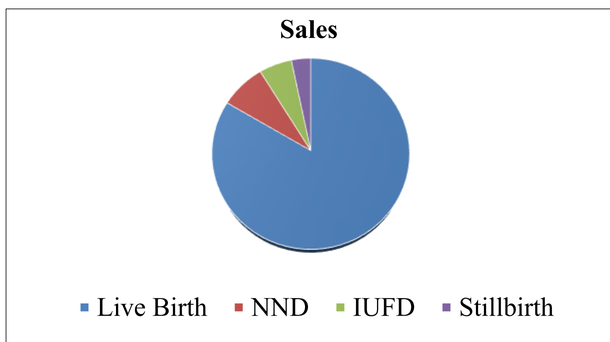

Figure 4: Distribution of fetal outcome in women with polyhydramnios.

DISCUSSION

Findings of our study aligns to prior research by Magann et al they reported a similar distribution, where mild polyhydramnios (67%) was the most prevalent category in their cohort of pregnant women.[6] Their study also emphasized the higher frequency of mild cases, suggesting that mild polyhydramnios tends to be less associated with adverse maternal and fetal outcomes compared to moderate or severe polyhydramnios. However, our study also identifies a smaller proportion of severe cases (6.7%), which corroborates findings by Dashe et al who demonstrated that severe polyhydramnios, though less common, poses higher risks for maternal and neonatal complications, such as preterm birth and fetal anomalies.[7]

Study by Moore and Cayleet al who reported a higher prevalence of polyhydramnios in primigravidas in their cohort.[8,9] However, the presence of multigravidas (G2 and G3) in our study suggests that polyhydramnios may also affect women with previous pregnancies, warranting further also affect women with previous pregnancy warranting further investigation into the role of parity in the development of this condition. Our study suggests on gestational age showed that most cases (57.8%) fell within the 37-40 weeks range, indicating that polyhydramnios often develops in the later stages of pregnancy, which is consistent with findings by Hill et al.[10]

Study by Suri et al, the researchers evaluated 100 cases of polyhydramnios in a tertiary care hospital.[11] Their findings demonstrated that leaking per vaginum (PV) was reported by 45% of the women, while abdominal pain was noted in 40% of cases. These findings are consistent with our study, reinforcing the commonality of leaking PV and abdominal pain as leading symptoms in polyhydramnios cases. Additionally, shortness of breath was reported by 5% of patients in their study, mirroring the 5.6% incidence in our study, suggesting that this symptom, though less common, remains a significant concern. Sohail et al reported idiopathic polyhydramnios in 52% of cases, which is consistent with our 55.6%.[12] They found fetal congenital anomalies in 28% of cases, nearly identical to our findings, while GDM was identified in 13% of cases, close to our reported 12.2%. Their study also reported a lower rate of Rh incompatibility at 3%, which is slightly lower than our 4.4% cases.

Our study shows that preterm labor was one of the most common maternal outcome, occurring in 31.1% of the cases. This is aligned with findings from Dashe et al, where preterm labor was reported in 30% of cases. Similarly, Suri et al observed preterm labor in 28% of their cases.[13] Meconium-stained amniotic fluid (MSAF) was the second most frequent outcome in our study at 10.0%, aligning with Phelan et al who reported an 11% incidence of MSAF.[14] Our malpresentation rate of 7.8% is comparable to Begum et al who found a 7.5% rate.[15] Fetal distress was noted in 6.7% of our cases, slightly lower than Sohail et al who reported it in 8% of cases.[12] Abruptio placentae occurred in 5.6% of our cases, similar to Suri et al at 6%.[11] Postpartum haemorrhage (PPH) was observed in 4.4%, close to Dashe et al where it was seen in 5% of cases.[7] Cord prolapse/presentation was the least common in our study at 3.3%, aligning with Begum et al where it

was reported in 3% of cases.[15] Study by Magann et al reported that 20-30% of newborns from pregnancies complicated by polyhydramnios had APGAR scores ≤7.[6] Thesis very similar to the 25.6% of newborns to our study with scores of 7 or less.

Limitations

This study had certain limitations. It was a single-center study with a relatively small sample size, which may limit the generalizability of the findings. The study included both retrospective and prospective data, and information from retrospective records may have been incomplete or subject to documentation bias. Being a cross-sectional observational study, a causal relationship between polyhydramnios and adverse maternal or fetal outcomes could not be established. As the study was conducted in a tertiary care referral center, referral bias may have influenced the incidence and severity of complications observed. Additionally, long-term neonatal outcomes were not assessed, as follow-up was limited to the intrapartum and immediate neonatal period.

CONCLUSION

The study identified AFI levels as a significant determinant of fetal outcomes. Higher AFI levels, particularly those above 35 cm, were related to markedly increase in risk of adverse outcomes. This suggests that careful monitoring and management of AFI during pregnancy are essential to improving fetal survival rates. Interventions should be targeted to address high AFI levels to minimize risks. Gestational age emerged as another critical factor affecting fetal outcomes. Pregnancies at earlier gestational ages (especially 28-32 weeks) were found to be having significantly greater risk of adverse outcomes. In contrast, pregnancy between 36-40 weeks had the most favorable outcomes. This finding underscores the importance of efforts to prevent preterm births and extend pregnancies to full term whenever possible to optimize fetal health. Birth weight was significantly associated with fetal outcomes, with lower birth weights (1.0-2.0 kg) linked to higher rates of adverse outcomes. Conversely, birth weights in the 2.6-3.0 kg range were associated with the best outcomes. These findings highlight the need for reasonable prenatal care, nutritional support, and monitoring to ensure fetal growth is optimal and risk of low birth weight is reduced. APGAR scores at both1 and 5 minutes were strong predictors of fetal outcomes. Newborns with lower scores (≤7) were significantly more likely to have adverse outcomes and most of them had congenital malformations and prematurity, while those with higher scores (>7) had better chances of survival. This highlights the crucial nature of timely neonatal assessment and resuscitative efforts in improving survival rates and reducing morbidity. The study found no significant association between fetal outcomes and factors such as gravida status, mode of delivery, or NICU admission. This suggests that, in this population, the number of pregnancies, method of delivery, and NICU admission did not independently affect fetal survival. However, these factors might still play a role in specific contexts and warrant further investigation.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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