

Polyhydramnios- Ultrasonographically Detected Incidence and Neonatal Outcome

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Abstract

Objectives: To determine the incidence of polyhydramnios ultrasonographically and it's relationship with perinatal and obstetric outcome.

Background: Polyhydramnios is an important obstetric complication with increased perinatal morbidity and mortality. Undoubtedly, ultrasound is the best means to diagnose polyhydramnios. Though AFI is a reliable indicator, gestational age specific percentile charts provide accurate reproducibility and are indispensable for the monitoring of ongoing pregnancy at risk. Early diagnosis enables detailed evaluation of the mother and fetus, and guides further management.

Place and duration of study: The present study was conducted in Govt. Victoria Hospital, Visakhapatnam for a period of two years from July 2012 to June 2014.

Results: Total number of deliveries in two years was 16,834 out of which 106 had polyhydramnios and 80 of these were studied. Incidence of polyhydramnios in this period was 0.62%. 23% had no associated maternal disease. 70% had mild polyhydramnios, and only 10% had severe polyhydramnios. Neural tube defects (7.5%) were the most common congenital anomaly. Out of 80 cases, 1 case was an abortion which was induced due to fetal anomaly, 22 cases had preterm vaginal deliveries out of which 12 cases were induced due to fetal anomalies, 41 cases had full term vaginal deliveries out of which one case was induced due to fetal anomaly, 16 cases had cesarean section out of which 4 were preterm. The most common maternal complication encountered was preterm labour and the most common malpresentations were face and breech. Most of the cases of mild and moderate polyhydramnios delivered alive babies while most of the cases of severe polyhydramnios met with early neonatal deaths. 89% babies were born alive, perinatal mortality rate was 200 per 1000 live births while early neonatal death rate was 88 per 1000 live births.

Conclusion: Incidence of polyhydramnios was 0.62%. In our series, most of the fetal anomalies were found in moderate and severe polyhydramnios; among these, neural tube defects were the most common and anencephaly was the most common neural tube defect. All the anomalies were picked up by ultrasound.

I. Introduction

Polyhydramnios is defined as the deepest vertical pool of 8cms or greater or an amniotic fluid index above 95th centile for gestational age¹. In older studies, the incidence of polyhydramnios was 3.5%, but more recent studies give an incidence of 0.2% due to earlier diagnosis and better management of pregnancies with fetal congenital anomalies².

Perinatal morbidity and mortality are significantly increased with polyhydramnios. Fetal conditions that are associated with polyhydramnios include major congenital anomalies (open neural tube defects, upper gastrointestinal tract obstruction or malformation etc.) and both the immunologic and the non-immunologic forms of hydrops fetalis.

With the appearance of routinely performed ultrasound during pregnancy, several methods have been used to describe the amount of amniotic fluid. It has been shown that AFI is quite reliable in determining normal or elevated volumes. 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. Nevertheless, standardized objective indices provide accurate reproducibility and are indispensable for the monitoring of ongoing pregnancy at risk³.

In the past few years, polyhydramnios has been extensively studied. With better facilities for detailed investigation of the mother and the fetus, more causative factors can be identified and this helps in the counseling of parents regarding etiology of polyhydramnios, fetal prognosis, recurrence risks and different management options for the baby if it needs medical or surgical care after birth⁴.

The purpose of this study is to determine the incidence of polyhydramnios in our hospital set-up and the relationship between amniotic fluid index as estimated by ultrasound studies and perinatal outcome. The intra- and interobserver variability of amniotic fluid index was 7.4 and 10% respectively.

II. Methodology

The present study was conducted in Govt. Victoria Hospital for a period of two years. Total number of cases of polyhydramnios during this period were 106, out of which 80 cases were studied.

Type of study : Prospective

Period of study : July 2012 to June 2014

Number of subjects : 80

Inclusion criteria :

- Pregnancy associated with excess of amniotic fluid i.e. 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 period
- Multiple pregnancy with polyhydramnios

Period of follow up : From the first ANC to 7 days post-partum

Technique of estimation of amniotic fluid : A thorough obstetric ultrasound examination done using a linear or curvilinear transducer. For routine obstetric ultrasound examination, a 3.5-5MHz transducer was used. The ultrasound was transduced perpendicular to the plane of the floor and aligned longitudinally with the patient's spine, vertical depth of the largest amniotic fluid pocket was measured and the amniotic fluid index was calculated from the sum of four quadrant pocket depths.

Evaluation : Polyhydramnios was diagnosed when the AFI was more than 95th percentile for the gestational age. In addition, standard fetal biometric data were obtained. The fetal lie, presentation, position, assessment of gestational age and placental site were determined. A systematic fetal organ review was then performed in an attempt to detect any gross congenital abnormalities. Other necessary investigations also were carried out.

Outcome : Pregnancy outcomes were recorded for patients who were classified as having an excess amount of amniotic fluid. Gestational age was established by a reliable last menstrual period or the patient's ultrasound examination. Those cases with gross congenital anomalies incompatible with life were advised termination after explaining the risk of the procedure. Labour was induced with extra-amniotic instillation of ethacridine lactate or dinoprostone gel or tablet misoprostol or balloon catheter or artificial rupture of membranes (ARM) or oxytocin drip. The fetal outcome was recorded. The alive neonates were followed upto 7 days post-partum.

III. Results

The study of polyhydramnios was conducted on 80 cases from July 2012 to June 2014 in Government Victoria Hospital (VGH) attached to Andhra Medical College, Visakhapatnam.

Total number of deliveries in two years : **16,834**

Total number of cases with polyhydramnios in two years : **106**

Number of cases studied : **80**

The incidence of polyhydramnios in pregnancy in this period was 0.62%.

In the present study, 58% of the patients were in the age group of 21-25 years, 21% were in the age group of 16-20 years and 21% were above 25 years. With respect to gravidity, 58% were multigravida and 42% were primigravida. Out of 80 cases of polyhydramnios, 4 were between 23-27 weeks, 6 were between 28-32 weeks, 33 cases were between 33-37 weeks and 37 cases were >37 weeks. Only 3 patients had acute polyhydramnios and presented with symptoms like abdominal pain, abdominal discomfort, respiratory distress etc.

Table-1 Period Of Gestation Associated With Severity Of Polyhydramnios

Period Of Gestation (Weeks)	No. Of Cases	Severity Of Polyhydramnios		
		Mild N(%)	Moderate N(%)	Severe N(%)
23-27	4	1(25)	3(75)	
28-32	6	1(17)	1(17)	4(66)
33-37	33	22(67)	7(21)	4(12)
>37	37	32(86)	5(14)	-
Total	80	56(70)	16(20)	8(10)

In the present study, 70% had mild polyhydramnios, 20% had moderate polyhydramnios while only 10% had severe polyhydramnios. None of the cases of severe polyhydramnios went beyond 37weeks.

Table-2 Severity Of Polyhydramnios

Severity Of Polyhydramnios	No. Of Cases
Mild	56
Moderate	16
Severe	8
Total	80

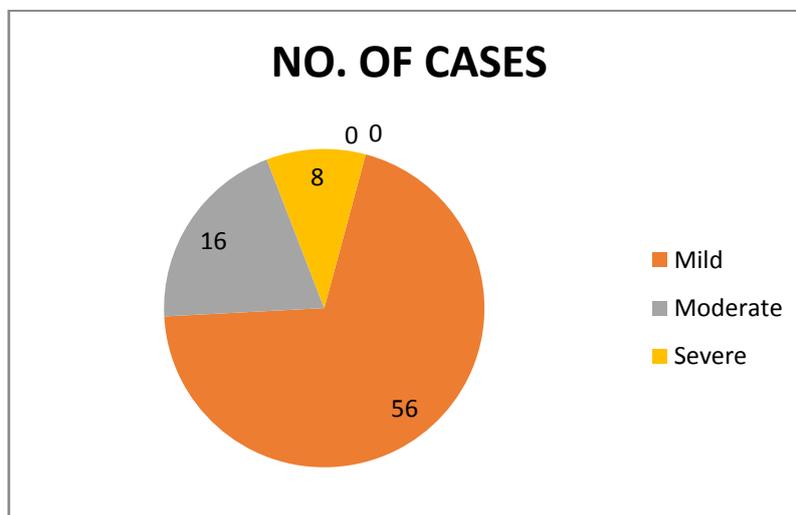


Table-3 Maternal Conditions Associated With Polyhydramnios

Maternal Condition	No. Of Cases, N(%)
Pre-Eclampsia	11(14%)
Gestational Hypertension	4(5%)
Gestational Diabetes Mellitus	4(5%)
Anemia	57(71%)
Rh Negative Pregnancy	1(1%)
Hypothyroidism	3(4%)
Placenta Previa	1(1%)
Multiple Gestation	2(2.5%)
No Associated Condition	18(23%)

Out of 80cases of polyhydramnios, 71% were associated with anemia, 14% with pre-eclampsia, 5% with gestational hypertension, 5% with gestational diabetes, 4% with hypothyroidism, 1% with Rhesus negative pregnancy, 1% with placenta previa, 2.5% with multiple gestation and 23% had no associated condition.

Table-4 Severity Of Polyhydramnios Associated With Congenital Anomalies

Congenital Anomalies	Severity Of Polyhydramnios			Total N(%)
	Mild	Moderate	Severe	
Anencephaly			2	2(2.5%)
Anencephaly + Spina Bifida			2	2(2.5%)
Anencephaly + Meningomyelocele			1	1(1.25%)
Occipital Encephalocele	1			1(1.25%)
Pseudotumor Of Umbilical Cord		1		1(1.25%)
Non-Immune Hydrops Fetalis	1			1(1.25%)
Fetal Ascites	1			1(1.25%)
Skeletal Dysplasia		2		2(2.5%)
Dandy Walker Syndrome		1		1(1.25%)
Dilated Pelvicalyceal System	1	1		2(2.5%)
Diaphragmatic Hernia			1	1(1.25%)
Thoracopagus Conjoined Twins		1		1(1.25%)

The above table shows the types of congenital anomalies that were found in the present study. Majority, 65 cases(81%) had no fetal anomaly. Neural tube defects (7.5%) were found to be the most common anomaly.

Among these, anencephaly was the most common, found in 5 cases, occurring either singly or in combination with another neural tube defect. 2.5% of the cases were associated with skeletal dysplasia and 2.5% of the cases were associated with dilated pelvicalyceal system. In this study, most of the congenital anomalies were found to be associated with moderate and severe polyhydramnios. None of the congenital anomalies went undiagnosed in ultrasound.

Table-5 Gestational Age At Diagnosis Of Anomalies

Period Of Gestation (Weeks) At Diagnosis Of Anomalies	No. Of Cases With Anomalies
23-27	4
28-32	4
33-37	7
>37	-

The above table shows that majority of the anomalies were diagnosed beyond 32weeks. Only 4 each were diagnosed between 22-27 and 28-32 weeks, while 7 cases with anomalies were diagnosed beyond 32weeks. All anomalies were diagnosed in the first antenatal scan.

Table-6 Type Of Delivery/Abortion

Types	No. Of Cases
Abortion	
Spontaneous	-
Induced	1
Vaginal	
Preterm	22
Full Term	41
Cesarean Section	16
Total	80

The above table shows the type of delivery in 80 cases - one case was an abortion which was induced on the basis of fetal anomaly - occipital encephalocele.

- There were 22 preterm vaginal deliveries out of which 12 cases were induced either because of fetal anomalies or intrauterine death or both.
- 41 cases had full term vaginal deliveries out of which 3 cases were forceps deliveries (one outlet and two midlow). One case was induced because of fetal congenital anomalies, one was induced for IUD, 2 cases were induced for past dates and 2 cases were induced for term gestation with polyhydramnios.
- 16 cases had cesarean section because of fetal distress, CPD, compound presentation, previous cesarean section, big baby. 12 cases had term cesarean sections. 4 had preterm cesarean sections, the indications being, CPD, severe pre-eclampsia, thoracopagus twins and placenta previa.

Table-7: Maternal Complications During Pregnancy

Maternal Complications	No. Of Cases
Preterm Labour	4
PPROM	2
PPH	1

Table-8 Fetal Malpositions And Malpresentations Associated With Polyhydramnios

Fetal Malpositions And Malpresentations	No. Of Cases
Face	3
Breech	3
Unstable Lie	1
Compound Presentation	2
Occipito-Posterior	2

There were 4 cases of preterm labour, 2 cases of preterm premature rupture of membranes (PPROM) both of which delivered vaginally; one had an anomalous fetus with anencephaly and meningocele which delivered with face presentation; the other was a case of monochorionic monoamniotic twin gestation wherein the mother suffered postpartum hemorrhage (PPH). One case had unstable lie of fetus, but it delivered vaginally with cephalic presentation. Both the cases with occipito-posterior position were delivered by cesarean section. There were 3 cases with face presentation, out of which 2 were associated with anencephaly, one with occipital encephalocele and all the three delivered vaginally. There were 3 cases with breech presentation, 2 delivered

vaginally (out of which one had a preterm still born fetus with skeletal dysplasia) while 1 underwent cesarean section for coexistent CPD.

Table-9 Fetal Outcome Associated With Severity Of Polyhydramnios

Fetal Outcome	Severity Of Polyhydramnios			Total
	Mild	Moderate	Severe	
Alive At Birth	52	12	7	68+ 2 Sets Of Twins
Perinatal Deaths	3	5	8	16
Dead Abortus	1	-	-	1

The above table shows the association between fetal outcome and severity of polyhydramnios. Most of the cases of mild polyhydramnios had alive babies(52). The same holds good with moderate polyhydramnios in which 12 babies are born alive in comparison to 5 perinatal deaths. However, with severe polyhydramnios, majority of the babies born alive met with early neonatal deaths and hence contributed significantly to perinatal mortality. Total number of babies born alive were 68+2 sets of twins. Perinatal deaths were 16 because of fetal congenital anomalies, intrauterine demise, prematurity and birth asphyxia. Out of 16, fresh still born babies were 2 (both had skeletal dysplasia and labour was induced at 32 weeks), macerated fetii were 7 (5 fetii were anomalous and in 2 cases the cause was unknown) and the number of early neonatal deaths was 7 because of prematurity, intrapartum asphyxia and fetal congenital anomalies. The dead abortus was anomalous. The perinatal mortality rate was 200 per 1000 live births and the early neonatal death rate was 88 per 1000 live births.

IV. Discussion

The ultrasound study of polyhydramnios with neonatal outcome was conducted on 80 cases to ascertain the various etiological factors, maternal complications and fetal outcome of polyhydramnios. The diagnosis of polyhydramnios was done by ultrasound method using amniotic fluid index(AFI). Various aspects of polyhydramnios have been studied extensively in the recent past.

Regarding the incidence of polyhydramnios, various studies have quoted various figures.

Study	Incidence
Anisa Fawad Et Al ⁵	2%
Kuang Chao Chen Et Al ⁶	0.7%
Dr. Saadia Tariq Et Al ⁸	2.1%
Present Study	0.62%

In the study by Shruti Saralaya et al⁷, majority of the cases of polyhydramnios were above 37weeks irrespective of the severity.

In the present study, 46 % of the cases were diagnosed beyond 37weeks followed by 41% between 33 and 37weeks and the remaining before 33weeks. Majority of the cases of mild polyhydramnios were diagnosed beyond 37weeks while majority of the cases of moderate and severe polyhydramnios were diagnosed at or before 37weeks.

In the study by Dr. Saadia Tariq et al⁸, 70.7% had no associated maternal disease. In the present study, majority of the cases (71%) were associated with anemia. This observation can be explained by the high prevalence of anemia in our country. Only 23% had no associated maternal disease in the present study.

In the study by Hill et al², 88% of the cases had mild polyhydramnios while 12% had an AFI above 30cms. In the study by Anisa Fawad et al⁵, 57% of the cases had mild polyhydramnios, 26% had moderate polyhydramnios and 17% had severe polyhydramnios.

Severity of Polyhydramnios	No. of cases		
	Anisa Fawad et al ⁵	Hill et al ²	Present study
Mild (25-30cms)	40(57%)	36(88%)	56(70%)
AFI>30cms	30(43%)	5(12%)	24(30%)
Moderate (31-35cms)	18(26%)	-	16(20%)
Severe (>35cms)	12(17%)	-	8(10%)

In the present study too, majority of the cases (70%) had mild polyhydramnios, 20% had moderate polyhydramnios while 10% had severe polyhydramnios.

The following table compares the incidence of fetal anomalies in polyhydramnios in various studies:

Study	Incidence of congenital malformation	No anomaly
Shetty et al ⁹	24.1%	75.9%
Anisa Fawad et al ⁵	37.1%	62.8%

Dr. Saadiq Tariq et al ⁸	31.7%	68.3%
Present study	19%	81%

In all the above studies including the present study, majority i.e. 81% of the cases had no anomaly. Incidence of congenital anomalies was 19%, out of which 7.5% were neural tube defects which were the most common anomaly.

In comparison to the study by Shetty et al⁹, the incidence of congenital anomalies varies with the severity of polyhydramnios as below :

Amniotic fluid index	Incidence of congenital malformations	
	Shetty et al ⁹	Present study
25-30	5.9%	7.1%
>30	50%	45.8%
Total	24.1%	19%

Also similar to the above studies, most of the fetal anomalies were found in moderate and severe degree of polyhydramnios. Thus, with an AFI>30cms, the chances of finding an associated fetal anomaly increases.

The following table shows the incidence of maternal complications, fetal malpositions and fetal malpresentations in polyhydramnios in comparison to the study by Shruti Saralaya et al⁷:

Complication	Incidence	
	Shruti saralaya et al ⁷	Present study
PPROM	14%	2.5%
Pre-labour rupture of membranes	24%	-
Preterm labour	18%	5%
Fetal malposition and malpresentation	16%	13.75%
PPH	-	1.25%
Cord prolapse	4%	-

In the study by Anisa Fawad et al⁵, the live birth rate was 73.68%, in the study by Dr. Saadia Tariq et al⁸, the live birth rate was 68.2% while in the present study, 89% babies were born alive, perinatal mortality rate was 200 per 1000 live births while early neonatal death rate was 88 per 1000 live births.

V. Summary

The findings of the present study are summarized as below :

- Incidence of polyhydramnios was 0.62%
- In our series, majority of the patients were multigravida.
- Most of the cases were mild polyhydramnios and majority of them were diagnosed after term. Most of the cases of moderate and severe polyhydramnios were diagnosed before 37 weeks.
- Most of the fetal anomalies were found in cases of moderate and severe polyhydramnios.
- Neural tube defects were the most common congenital anomaly associated with polyhydramnios and among neural tube defects, anencephaly was the most common.
- 24% cases were induced because of congenital anomalies, IUD and past dates.
- Cesarean section rate was 20%, the indications being fetal distress, CPD, unstable lie, compound presentation, previous cesarean section and big baby.
- PPRM, preterm labour and PPH were the major maternal complications during pregnancy. Face presentation, breech presentation, unstable lie, occipito-posterior were the fetal malpositions and malpresentations encountered.
- We did not have any maternal mortalities.
- The live birth rate was 89% and perinatal death rate was 200 per 1000 live births.
- Amniotic fluid index is the guiding tool for early diagnosis of congenital anomalies and early obstetric intervention. This further helps in reducing the rate of maternal complications of polyhydramnios.

VI. Conclusion

In our study of 80 cases of polyhydramnios, we conclude that:

- Ultrasonography is the best means for early detection of polyhydramnios.
- Integration of AFI as a part of routine obstetric ultrasound is a useful means for early identification of high risk cases and may often lead to a successful search for congenital anomalies.
- With the advent of TIFFA scan, more and more cases of congenital anomalies are detected early in pregnancy thereby paving the way for early intervention.
- The majority of the cases of polyhydramnios in the present study were categorized as mild while majority of the fetal anomalies were found to be associated with moderate and severe polyhydramnios.

- A careful study must be done for detection of etiological factors in all cases of polyhydramnios, to improve the fetal outcome as well as to prevent maternal complications.
- In cases without anomalies, the pregnancy continues till term. Induction of labour, in the absence of obstetric indications, is advisable at term to reduce maternal discomfort due to overdistended abdomen.
- For every case of polyhydramnios, in the first stage, controlled ARM is done. In the second stage of labour, following delivery of the anterior shoulder, injection methergine 0.2mg is given intramuscularly. Active management of third stage of labour is a must in every case of polyhydramnios.

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