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Clinical Study of Oligohydramnios, Mode of Delivery and Perinatal Outcome

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Abstract: *Estimation of amniotic fluid volume is a good predictor of maternal and perinatal outcome. Oligohydramnios is due to anamolies of fetus and functional disorders of mother , fetus and placenta. A prospective hospital based study of hundred antenatal women conducted at Guntur Government Hospital (GGH) Guntur Medical College , Guntur from October 2007 to October 2008. Oligohydramnios influence both maternal and perinatal outcome .There is increased incidence of instrumental deliveries and caesarean sections in the pregnant women with oligohydramnios. It increases the incidence of adverse perinatal outcomes like fetal distress, meconium stained liquor , low APGAR scores , low birth weight , NICU admission , perinatal morbidity and mortality. The incidence of oligohydramnios is more in unbooked cases. In this study PIH can be attributed to be one of the aetiological factors of oligohydramnios. The incidence of instrumental deliveries and caesarean section rates(58%) are high when compared to control group. The incidence of fetal distress(40%), meconium stained liquor (36%), low APGAR (20%), low birth weight(56%), and NICU admissions (34%) when compared to control group..*

Keywords: *Oligohydramnios , fetal distress , meconium stained liquor , IUGR, APGAR score and caesarean delivery.*

I. Introduction

The importance of amniotic fluid volume as an indicator of fetal status is a relatively recent development .It plays a major role in the development of fetus. Amniotic fluid allows proper growth and development of fetal long bones and musculoskeletal system , it has bacteriostatic and anti inflammatory properties[1] Oligohydramnios , AFI <5 cm has been circumstantially associated with variety of ominous pregnancy outcome such as perinatal death , fetal distress in labour , poor infant condition at work . obstetricians have increasingly resorted to induction of labour or antepartum testing of fetal health in pregnancies complicated by decreased amniotic fluid volume . Due to wide spread application of sonogram derived estimates provoked unnecessary interventions . we by this study sort to assess whether antepartum oligohydramnios is associated with adverse pregnancy outcomes.

Aims And Objectives

1.The study aims to assess the association of adverse perinatal outcome in cases with oligohydramnios diagnosed antepartum. The results are compared with perinatal outcome of controls (AFI 8-18 cm)
2. To identify the intrapartum sequalae of the sonogram diagnosed oligohydramnios such as caesarean section rates for fetal distress and condition of the newborn thereafter.

II. Review Of Literature

Hippocrates was the first to attribute the development of amniotic fluid to fetal urine . fetal urination is the major source of amniotic fluid after fetal kidney function begins at 10 – 12 weeks, fetal lung fluid is a minor contributor to amniotic fluid . the amniotic fluid volume changes during human gestation is provided as a compilation of 705 published observations of amniotic fluid volumes in normal pregnancies ranging from 8-43 weeks of gestation by Brace and Wolf[2].

The amniotic fluid volume rises progressively during gestation until approximately 32 weeks . From 32 weeks to term the mean amniotic fluid volume is relatively constant about 700-800 ml. After 40 weeks there is progressive decline in amniotic fluid volume average of about 400 ml at 42 weeks . Amniotic fluid volume along with gestational age, it also correlates with fetal and placental weight . Oligohyadramnios is associated with fetal congenital anamolies and IUGR . The severity of oligohydramnios is associated with degree of IUGR and it reflects the placental dysfunction [3] . Oligohydramnios can cause asymmetrical fetal growth , contracture of joints and hypoplasia of fetal lungs by decreasing the lung expansion due to compression of fetal abdomen which limits the movements of fetal diaphragm and decreases the flow of amniotic fluid into and out of the fetal

lung. Nicolaides K . H .et al .stated that oligohydramnios associated with IUGR and maternal diseases including maternal hypertension , the fetus is hypoxic . impaired placental function in addition to hypoxia contributes to oligohydramnios [4]. Reduced liquor volume in chronic hypoxia is due to redistribution of fetal organ perfusion towards the brain and away from the abdominal viscera including the fetal kidneys [5].

III. Methodology

This study was done at department of Obstetrics and Gynaecology ,Guntur Government Hospital (GGH) ,Guntur Medical College , Guntur, Andhra Pradesh from October 2007 to October 2008 for a period of 12 months .

Our analysis included a total of 100 antenatal women, both booked and unbooked were included in this study .

Inclusion Criteria

1.Patients who were sure of their LMP
2.Gestational age 37 weeks and above
3.Singleton pregnancies with cephalic presentation
4. Patients with AFI <5cm taken as study group and AFI 8-18 cm taken as control group

Exclusion Criteria

1.Pregnant women with gestational age less than 37 weeks
2.Multiple pregnancies
3. Patients complaining of premature rupture of membranes .

Method Of Collection Of Data :

After taking written and informed consent and fulfilling the inclusion criteria , patients were included into the study.

Method Of Study

Antenatal women with gestational age 37 weeks and above attending our Out Patient Department or Labour rooms were included in the present study. Detailed antenatal history including presence of high risk factors was elicited from the patient , then they were clinically examined and subjected to ultrasonography . In 1987 Phelan et al . described AFI as a method of semi-quantitatively estimating amniotic fliud volume [5]. Phelan et al . defined oligihydramnios as an AFI<5cm, AFI 5-8cm as borderline oligohydramnios and AFI 8-18 cm as normal amniotic fluid index.

Amniotic fluid index technique :

1. Patient is placed in supine poition
2. A linear , curvilinear or sector transducer can be used
3. Divide the uterus into 4 quadrants using the maternal sagittal midline vertically and an orbitrary transverse line approximately half way between the symphysis pubis and upper edge of uterine fundus.
4. The transducer must be kept parallel to the maternal sagittal plane and perpendicular to maternal coronal plane .
5. The deepest , unobstructed and clear pocket of amniotic fluid is visualised and the image is frozen . the ultrasound callipers are manipulated to measure the pocket in a strictly vertical direction .
6. The process is repeated in each of the 4 quadrants and pocket measurements summed =AFI.
7. If the AFI<8cm perform the 4 quadrant evaluation 3 times and average the values.

Repeat examination by a single observer results in best accuracy.Other factors that affect AFI reproducibility are measuring narrow pockets , measuring into gray or ‘fuzzy ’ tangential section of placenta or fetal parts and measuring the same pocket twice in adjacent quadrants .

The effect of fetal movement during the scanning process may change the AFI of 1.5 -2.5cm [7].

The AFI values obtained with the sector or curvilinear transducers were as reliable as those obtained with gold standard linear transducer[8].

In this study 50 women with AFI < 5cm were allotted into the study group and another 50 women with AFI 8-18 cm were included into the control group. Labour was either spontaneous or induced in both study and control group . During labour intermittent auscultation of fetal heart rate was done to detect any signs of fetal distress. Artificial rupture of membranes was done in active phase of labour to notice the grade of liquor and progress of labour was monitored on a partogram . Mode of delivery and intrapartum complications were noted . At birth neomnate was assessed using 5minute APGAR score , birth weight weight was recorded and neonate who were admitted into NICU were followed until discharge .

Statistical Analysis

Information of cases under study is arranged in a systematic manner in MS-Excel sheet . Appropriate statistical analysis viz frequencies , cross tabulations , percentages , chi-square test is carried out and given the significance of study.

IV. Results And Discussion

A total number of 100 antenatal women with term pregnancies who had undergone both clinical and ultrasonographic assessment for amount of liquor were recruited under present study at Guntur Government Hospital(GGH), Guntur Medical College , Guntur between October 2007 to october 2008.
Various factors were studied and compared between two groups as follows

Table : 1 Booked And Unbooked Cases

Booked and Unbooked	Study group(AFI<5cm)		Control group(AFI 8-18cm)	
	No	%	No	%
Booked	34	68%	40	80%
Unbooked	16	32%	10	20%

This table shows that low AFI is marginally more common in unbooked cases compared to booked cases indicating that proper antenatal care with emphasis on amount of liquor clinically an early admission as per requirement reduces the number of cases with oligohydramnios

Table :2 Age Distribution And Amniotic Fluid Index

AGE	Study group(AFI<5cm)		Control group(AFI 8-18cm)	
	No	%	No	%
15-20	20	40%	23	46%
21-25	28	56%	27	545
26-30	2	4%	-	-

The above table shows that there is no significant difference found in the age group of patients among the study and control

Table : 3 Gestational Age And Its Influence Over Afi

Gestational age	Study group(AFI<5cm)		Control group(AFI8-18cm)	
	No	%	No	%
37-40 weeks	35	70%	43	86%
41weeks	11	22%	7	14%
>42 weeks	4	8%	-	-

In the present study the incidence of oligohydramnios was high among post term pregnancies(30%). The association of prolonged pregnancy and oligohydramnios was found to be significant ($p < 0.05$) by chi-square test

Table: 4 Incidence Of Pregnancy Induced Hypertension

Classification	Study group(AFI<5cm)		Control group(AFI8-18cm)	
	No	%	No	%
Mild PIH	24	48%	7	14%
Severe PIH	2	4%	-	-

The incidence of PIH was high(52%) in the study group . Hence PIH can be attributed to be one of the aetiological factors for oligihydramnios . This is compared to the study of Kamala Ganesh et al . (1989) found significant association of PIH with oligohydramnios[9].

Table:5 Induction Of Labour

Method of induction	Study group		Control group	
	No	%	No	%
PGE_2	14	28%	4	8%
Misoprostol	8	16%	-	-
Oxytocin	2	4%	2	4%

The induction of labour was significantly high in study group (48%). The significance of association was found to be high ($p<0.05$) using chi-square test. This study is compared to the study of Casey et al[10] . The induction rate was reported to be 42 %.

Table: 6 Mode Of Delivery In Induction Group

	Induced	Labour normal		Outlet forceps		Caesarean section	
		No	%	No	%	No	%
Study group	24	4	16%	2	8%	18	75%
Control group	6	4	66%	-	-	2	33%

The above analysis shows that in study group the incidence if caesarean section rate (75%) is high when compared to control group.

Table: 7 Mode Of Delivery In Spontaneous Group

	Spontaneous	Labour normal		Outlet forceps		Caesarean section	
		No	%	No	%	No	%
Study group	26	9	34%	6	13%	11	42%
Control group	44	20	5%	2	4.5%	13	29%

The above table shows that in study group with spontaneous onset of labour pains the incidence of instrumental delivery (13 %) and caesarean section rates (42%) are high when compared to control group.

Table: 8 Indications Of Caesarean Section

Indications	Study group		Control group	
	No	%	No	%
Fetal distress	20	40%	5	10%
Others	9	18%	10	20%
Total	29	58%	15	30%

On analysing the indications for caesarean section fetal distress was found to be dominant indication in study group (40%) when compared to control (10%). This difference was found to be significant by chi-square test($p < 0.05\%$) The other indications for caesarean sections to both study and control group are PIH, cephalo-pelvic disproportion and failed induction.

Table: 9 Meconium Stained Liquor Grading

Grade	Study group		Control group	
	No	%	No	%
Grade-1(thin)	10	20%	7	14%
Grade-2(moderate)	-	-	-	-
Grade-3(thick)	8	16%	-	-
Total	8	36%	7	14%

The incidence of meconium stained liquor in the study group was 36% when compared to control group 14 %.

Table:10 Low Amniotic Fluid Index And 5min Apgar Score

APGAR	Study group		Control group	
	No	%	No	%
0-3	3	6%	-	-
4-6	7	14%	2	4%
7-10	40	80%	48	96%

The APGAR scores at 5 minutes were compared between the study and control groups .20 % of the cases in study group had APGAR less than 7 , compared to 4% of cases in control group.

Table:11 Nicu Admission And Meconium Aspiration Syndrome

	Study group(AFI<5cm)		Control group(AFI8-18cm)	
	No	%	No	%
NICU admission	17	34%	4	8%
MAS	3	6%	-	-

The incidence of NICU admission in study group (34%) when compared to 8% in control group. The incidence of meconium aspiration syndrome (MAS) was 6% in study group while nil in control group. There is a clear association between oligohydramnios and increased incidence of meconium aspiration syndrome as well as NICU admissions [11].

Table: 12 Low Amniotic Fluid Index And Birth Weight

Birth weight	Study group(AFI<5cm)		Control group(AFI8-18cm)	
	No	%	No	%
<2 k	6	12%	1	2%
2.1-2.5kg	28	56%	12	24%
2.6-3kg	14	28%	27	54%
>3kg	2	4%	10	20%

The mean birth weight in the study group was 2.4kg. The incidence of low birth weight babies was as high as 56%. The rate of low birth weight was high 79.4% in studies by Youssef et al . [12].

Table :13 Neonatal Outcomes Of Pregnancies In Study And Control Groups

Factor	Study group		Control group		Statistical significance
	No	%	No	%	
Birth weight					
<2kg	6	12%	1	2%	
2.1-2.5kg	28	56%	12	24%	P<0.005
2.6-3kg	14	28%	27	54%	
>3kg	2	4%	10	20%	
APGAR at 5 min					
<7	10	20%	2	4%	P<0.03
>7	40	80%	48	96%	
NICU admission	17	34%	4	8%	P<0.4
MAS	3	6%	-	-	
Congenital malformation	1	2%	-	-	

Table : 14 Selected Intrapartum Outcomes In Study And Control Groups

Factor	Study group		Control group		Statistical significance
	No	%	No	%	
Induction of labour	24	48%	6	12%	P<0.05
PIH	26	52%	7	14%	P<0.44
Meconium stained liquor					
Grade-1	10	20%	7	14%	
Grade-2	-	-	-	-	P<0.03
Grade-3	8	16%	-	-	
Total	18	36%	7	14%	
No of caesarean sections	29	58%	15	30%	P<0.05
Caesarean sections for fetal distress	20	40%	5	10%	

V. Conclusion

The goal of antepartum fetal surveillance is to identify the fetus at risk, amniotic fliud volume has been proved an indirect measure of feto placental function. Hence the estimation of amniotic fluid index assists the obstetrician in risk assessment of various semi quantitative methods described four quadrant technique for AFI provides a most convenient and reproducible method of evaluating amniotic fluid volume .

Oligohydramnios i.e, AFI<5cm measured by ultrasonography in term pregnancies is associated with adverse perinatal outcome. It signifies the need for prevention early detection and timely intervention to prevent the associated complications.

Proper antenatal care with emphasis on clinical and ultrasonographic assessment of liquor preventing antenatal complications like pregnancy induced hypertension , post term pregnancies can probably reduce the incidence of oligohydramnios.

The risks of meconium staining of liquor, intrapartum fetal distress,operative delivery and perinatal mortality are significantly higher in patients with AFI<5cm , compared to those with AFI8-18 cm.

Early intervention in the form of induction of labour, close intrapartum monitoring ,artificial rupture of membranes in active phase of labour and grading of liquor and early decision making regarding mode of delivery are the steps to be taken to prevent poor perinatal outcome. Immediately after birth , proper resuscitation by a paediatrician is mandatory.

Hence it may be concluded that four quadrant assessment of amniotic fliud volume is a useful adjunct to antepartum fetal surveillance of high risk pregnancy.

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