

ORIGINAL ARTICLE

A Comparison of Amniotic Fluid Index versus Single Deepest Pocket Method in Terms of Maternal and Perinatal Outcome in Late Term Pregnancies

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Background: Over diagnosis of isolated oligohydramnios is associated with increased obstetrical intervention without improving maternal and perinatal outcome. Objective of this study is to evaluate two methods of amniotic fluid volume assessment regarding obstetrical intervention frequency and its effect on maternal and perinatal outcome.

Materials and Methods: This prospective study was conducted at a Private Hospital of Dera Ismail Khan and Khyber Teaching Hospital, Peshawar from 1st January 2017 till 31st December 2019. All pregnant patients with singleton, un-complicated pregnancy with period of gestation from 41 weeks to 41 weeks 6 days, live fetus were included in the study. Women who met the eligibility criteria were assigned to two different techniques of amniotic fluid assessment, first amniotic fluid index(AFI) method and second single deepest vertical pocket(SDVP) method. Data was recorded on a specially designed proforma. The socio-demographic variables were age in years, parity. Continuous variable was measured on numerical scale and expressed as mean and SD. Research variables were maternal outcome and perinatal outcome in terms of oligohydramnios frequency, induction of labour, caesarean section, fetal distress, NICU admission, A/S < than 7 at 5 minutes. Chi-sq test of significance was applied.

Results: A total of 160 patients met the inclusion criteria. In first group 30 (37.5%) and in second group 18 (22.5%) had oligohydramnios. In AFI group 10 (33.3%) and in SDVP group 3(16.66%) had caesarean section. Induction of labour was 30(37.5%) in AFI group and 18(22.5%) in SDVP group. These results were statistically significant with a p value less than .05 at 5% significance level. Fetal distress, A/S < than 7 at 5 minutes, NICU admission results were not statistically significant for two groups.

Conclusion: SDVP technique gave less abnormal results, less intervention with no significant difference in maternal and perinatal outcome.

Keywords: Amniotic fluid, Oligohydramnios, Caesarean section.

INTRODUCTION

Assessment of the amniotic fluid volume (AFV) is an essential part of ultrasound examination in obstetrical patient. Knowing the AFV helps clinicians to diagnose structural abnormality, compromised fetus and to decide about delivery plans.¹Oligohydramnios on ultrasound is the amniotic fluid index(AFI) less than 5th centile for gestational age or the deepest vertical pocket(SDVP) of amniotic fluid devoid of cord or foetal limbs measuring less than 2cm.² These are two commonly used methods of quantitative amniotic fluid assessment. Amniotic fluid Index is the measurement of the liquor in four quadrants of the uterus and then adding together those measurements.. It was first introduced by Phelan and Rutherford in 1987.^{3,4} In SDVP, only one vertical pool of liquor is measured, it was first described by Manning in 1980.^{5,6}

Now it is a matter of concern, which one is more reliable. There is no gold standard method. Both of them are non-invasive and provide quick assessment of liquor.^{7,8} Both of them are problematic, AFI is over-rating and SDVP is under-rating it.⁹ When AFI method was used, there were more chances of overdiagnosis of oligohydramnios leading to more obstetrical interventions like induction of labour without any improvement in neonatal outcome.²

Randomized controlled trials have been done using different techniques of AFV assessment in case of post-term pregnancies⁹, high risk pregnancies^{7,10} and late term pregnancy.¹¹Late term pregnancy is the pregnancy with period of gestation from 41 weeks 0 days till 41 weeks & 6 days. AFV is an important parameter of fetal outcome.⁶ Most clinicians decide either induction of labour or caesarean section, once oligohydramnios diagnosed in case of term pregnancy.¹²

Various studies have shown the increased perinatal morbidity in cases of oligohydramnios.¹³Normal amniotic fluid volume is important for proper growth and development of foetus.

Oligohydramnios is alarming for obstetricians because it is associated with adverse foetal outcomes such as intrauterine death, intrauterine growth restriction, increased frequency of foetal distress and increased neonatal hospital stay in NICU. Reduced liquor volume is associated with foetal congenital abnormality, maternal hypertensive or vascular disorders, placental insufficiency and membrane leakage or rupture.¹⁴But chances of foetal morbidity are less in patients with isolated oligohydramnios. Isolated or idiopathic oligohydramnios is labelled when no foetal abnormality, placental insufficiency, maternal complications or leaking of membranes are found apart from decreased liquor volume as an isolated finding.¹⁵

Chances of foetal morbidity in case of isolated oligohydramnios are because of increased incidence of umbilical cord compression, decreased oxygen supply to the fetus, therefore delivery is decided even in cases of uncomplicated term pregnancy as a standard practice.¹⁶

In Dera Ismail Khan no research study has been done to evaluate AFI and SDVP methods regarding maternal and perinatal outcome.

The objective of this study was to evaluate the clinical importance of these two diagnostic methods AFI versus SDVP regarding maternal and perinatal outcome and also to determine obstetrical intervention frequency as a result of oligohydramnios diagnosis.

MATERIALS AND METHODS

This prospective study was conducted at a private hospital of Dera Ismail Khan from 1st January 2017 till 31 December 2019. Sample size was 160 women fulfilling our inclusion criteria. During study period, 2000 patients were examined for antenatal care that was study population. Sampling technique was consecutive non probability. Inclusion criteria were all those pregnant patients with singleton, un-complicated late term pregnancy at period of

gestation 41 weeks 0 days to 41 weeks 6 days, live fetus, non-smoker with cephalic presentation. Those patients having multiple pregnancies, hypertensive, bad obstetrical history, ante-partum Hemorrhage, intrauterine growth retardation, abnormal fetus, RH incompatibility, pre labour rupture of membranes and previous caesarean section were excluded. Gestational age was assessed from menstrual history and confirmed by first trimester ultrasound records. Out of 2000 women, 160 women who met the eligibility criteria were included in the sample. They gave informed consent for study. Data was recorded on a specially designed proforma.

These 160 women were assigned into two groups for amniotic fluid assessment either by AFI or SDVP method with 1:1 allocation in each group of study. In 80 patients, Amniotic fluid volume (AFV) was assessed by AFI method. In another 80 patients AFV was assessed by SDVP method. An ultrasound device with 3.5 MHz curvilinear probe was used by the same Obstetrician. While measuring AFI, the probe was moved longitudinally in all the four quadrants of the uterus. Abdomen was divided into 4 quadrants using one vertical and one horizontal line both passing through umbilicus. Deepest vertical pocket free of fetal part and umbilical cord was measured. Measurements of the four quadrants were added together. The lower limit for diagnosis of oligohydramnios was measurement less than 5 cm. While in SDVP, only one deepest pocket of liquor was measured without any fetal part or umbilical cord. Its cut-off level was < than 2cm for diagnosis of oligohydramnios. Induction of labour was done as standard protocol in all patients diagnosed with oligohydramnios.

Sociodemographic variables were maternal age in years, parity groups. Research variables were frequency of oligohydramnios, induction of labour, caesarean section, fetal distress, Apgar score < than 7 at 5 minutes, admission to NICU. All research variables were nominal dichotomous variable. Age in years was measured on numerical scale and expressed as mean and SD. Parity groups were categorical variables. Categorical data was expressed as count & percentage. Categorical data was analyzed by chi-square test of association. A P-value < than 0.05 indicated statistical significance. The data was analyzed using SPSS version 19.

RESULTS

Total antenatal patients were 2000. Out of them 160 (8%) who met the inclusion criteria were included in study. In 80 patients, AFV

Table 4: Maternal and Foetal Outcome in Patients Induced for Oligohydramnios

S. No	Outcome	AFI (n=30)	SDVP (n=18)	95% CI in AFI gp	95% CI in SDVP gp	Chi ² Value	Dof	P Value
1	C/Section	10 (33.33)	3 (16.66%)	25.7-41.9%	79-25.3%	4.52	1	.033
2	Apgar Score less than 7 at 5	4 (13.3%)	2 (11.11%)	7.1-19.5%	3.71-18.5%	3.04	1	.081
3	Fetal distress	6 (20.0%)	3 (16.66%)	12.7-27.3%	7.9-25.3%	3.06	1	.08
4	NICU admission	2 (6.66%)	1 (05.55%)	2.16-11.16%	2-10.8%	3.00	1	.083

Caesarean section frequency was higher in AFI group as compared to SDVP group. This association of caesarean with AFI method was statistically significant with a chi-sq value of 4.52 and p value of less than .03 at dof 1 and significance level of 5%. Apgar score less than 7 at 5 minutes, foetal distress and NICU admissions in both groups were not statistically significant associated with techniques used for assessment of amniotic fluid volume, AFI or SDVP.

DISCUSSION

In this study mean maternal age was 30 years in AFI group and 31 years in SDVP group. While a study conducted by Agarwal the mean maternal age was 25 years in study group.¹⁴ Regarding parity 0-2 were 56 (70%) in AFI group and 60 (75%) in SDVP group. Parity 3-5 were 24 (30%) in AFI group and 20 (25%) in SDVP group. While in Hina Ahmed study Primigravida were 36

was assessed by AFI and in other 80 patients through SDVP method. Mean maternal age was 30 + 4.28 years in AFI group and 31+ 4 years in SDVP group. Parity from 0-2 in AFI group was 56 (70%) and 60 (75%) in SDVP group. Parity from 3 and above in AFI group was 24 (30%) and 20 (25%) in SDVP group.

Table 1: Socio-demographic features of Amniotic fluid index and single deep pocket group.

Variable	AFI N = 80	SDVP N = 80
Mean maternal age in years [+ SD]	30 (+ 4.28)	31 (+ 4)
Parity		
0-2	56 (70%)	60 (75%)
3 and above	24 (30%)	20 (25%)

In AFI group, oligohydramnios was diagnosed in 30 (37.5%) patients and in SDVP group in 18 (22.5%) patients respectively. Relative Risk was 1.66 with more cases diagnosed in AFI group

Table 2: Frequency of oligohydramnios and induction of labour in AFI and SDVP group.

Variable	AFI N = 80	SDVP N = 80	95% CI in AFI group	95% CI in SDVP group
Oligohydramnios	30 (37.5%)	18 (22.5%)	27.82- 47.18%	19.2-25.8%
Induction of Labour	30 (37.5%)	18 (22.5%)	27.82- 47.18%	19.2-25.8%

Frequency of Induction of labour was 30 (37.5%) in AFI group and in SDVP group it was 18 (22.5%) respectively.

Table 3: Association of induction of labour (IOL) with technique of amniotic fluid volume assessment

S.no	Technique used	IOL(yes)	IOL(no)
1	AFI	30	50
2	SDVP	18	62
		48	112

Frequency of intervention was statistically significantly higher in women who underwent AFI technique of AFV assessment with a p value of .038 at 5% significance level.

(50.7%) & multigravida were 35 (49.3%) in exposed group.¹⁶ In J.M. Morris study only Nulliparous women were included in study 778 (49%) and Alfirevic study only Nulliparous patients were included in the study.^{18,19}

Gestational age was 41 weeks to 41 weeks 6 days in the current study. Similar gestational age was seen in Alfirevic study.⁹ In Biplab study the gestational age ranged from 28 to 43 weeks in two groups with average age of 37 weeks. The cases of oligohydramnios was 45 (90%) in group I and 23 (46%) in group II. More cases of oligohydramnios were diagnosed in group I than in group II. (P < 0.0001).¹⁹ In Zhang J. study gestational age was 39 weeks in both the groups.¹² In Morris JM study the gestational age was 40 & more weeks.¹⁸ Oligohydramnios in the present study group was diagnosed in 30 (37.5%) patients in AFI group and 18 (22.5%) patients in SDVP group. In SAFE trial oligohydramnios was diagnosed in 49 (9.8%) of AFI group and 11 (2.2%) of SDVP group.¹⁷ In Biplah study, oligohydramnios was diagnosed in 45

(90%) in group I and 23 (46%) in group II.¹⁹ In Nabhan AF study significantly more cases of oligohydramnios were diagnosed with RR of 2.33 and 95% CI 1.67 to 3.24 and more women had induction of labour with RR of 2.10 and 95% C.I 1.60 to 2.76.² In this study more cases of oligohydramnios were diagnosed in AFI group with a RR of 1.66.

In the present study those patients who were diagnosed with oligohydramnios were induced. Initial studies have shown that perinatal mortality starts to increase from 40 weeks and reaches 4.8/1000 at 42 weeks of gestation.¹⁸ It is because of failing placenta causing oligohydramnios that lead to umbilical cord compression during uterine contractions. There were 10 (33.33%) of patients in AFI group and 3 (16.66%) of patients in SDVP group underwent cesarean section in this study. In SAFE trial, cesarean section was 88 (17.7%) in AFI group and 95 (18.9%) in SDVP group.¹⁷ In Agarwal study 35.3% (18 cases) underwent a caesarean section in the AFI group.¹⁴ In Alfirevic study caesarean section was 47 (18.8%) in AFI group in SDVP group it was 33 (13.2%).⁹ In Ahmed H. study 30 (42%) had caesarean section.¹⁶

The frequency of induction of labour was higher when oligohydramnios was diagnosed by the AFI technique 30 (37.5%). These results are comparable to Rosati study.⁶ In Alfirevic study more caesarean section were done in AFI group particularly for fetal distress (8% VS 4%).⁹ In Agarwal S study the most common reason for caesarean section was fetal distress (55.6%). His results were comparable to Krishma Jagatia.^{14, 20} Fetal distress, NICU admission & A/S < than 7 at 5 minutes were not statistically significant different. These results are comparable to Rosita⁶, Ahmad H¹⁶ & Agarwal.¹⁴

CONCLUSION

SDVP gave less abnormal results with less obstetrical intervention and with no statistically significant difference in perinatal outcome.

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