

Comparison of Frequency of Diagnosis, Induction of Labour and Caesarean Section in Patients with Isolated Oligohydramnios Diagnosed by Amniotic Fluid Index versus Single Deepest Vertical Pocket

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Author's Contribution

^{1,2} Conception of study

^{1,3,5} Experimentation/Study conduction

^{2,3,4,5} Analysis/Interpretation/Discussion

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Abstract

Objective: To compare the frequency of diagnosis, induction of labour, and caesarean section in patients with isolated oligohydramnios diagnosed by amniotic fluid index versus single deepest vertical pocket.

Study Design: Randomized controlled trial

Place and duration of study: Department of Obstetrics and Gynecology, Holy Family Hospital, Rawalpindi from March 2020 to August 2020.

Materials & Methods: A total of 110 (55 in each group), 18 to 35 years of age of parity <5 were included. Group A females were evaluated by using AFI and group B females were evaluated by using SDVP. Patients were managed according to standard protocol practiced in the department. Caesarean section was performed in case of fetal distress, in presence of meconium-stained liquor, or in case of failure to the progress of labour.

Results: In my study, oligohydramnios was recorded in 19/55 (34.50%) in group A (amniotic fluid index) versus 11/55 (20.0%) in group B (single deepest vertical pocket) (p-value = 0.086). Similarly, induction of labor was recorded in 19/55 (34.50%) in group A (amniotic fluid index) versus 11/55 (20.0%) in group B (single deepest vertical pocket) (p-value = 0.086) and caesarean section was recorded in 16/55 (29.09%) in group A (amniotic fluid index) versus 07/55 (12.73%) in group B (single deepest vertical pocket) (p-value = 0.035).

Conclusion: This study concluded that the frequency of diagnosis, induction of labor, and caesarean section in patients with isolated oligohydramnios diagnosed by the amniotic fluid index is higher as compared to single deepest vertical pocket.

Keywords: Oligohydramnios, Amniotic fluid index, Single deepest vertical pocket.

Introduction

Amniotic fluid volume is a fundamental part of the evaluation of fetal wellbeing. Amniotic fluid is vital for proper fetal growth and development.¹ In many high-risk conditions a reduction in amniotic fluid volume (oligohydramnios) is noted that is linked with poor perinatal outcome.² After diagnosing oligohydramnios at term, a plan of delivery is made either by inducing the patient or by performing a caesarean section.³ Amniotic fluid volume is calculated by using ultrasound, the techniques that are most commonly employed are the assessment of the amniotic fluid index (AFI) or the single deepest vertical pocket (SDVP) technique.⁴

Oligohydramnios is associated with higher rates of adverse fetal and neonatal outcomes that include a 5-fold increase in stillbirths and a 3-fold rise in neonatal deaths.⁵ Oligohydramnios is diagnosed if the AFI measures less than or equal to 5cm. When using the SDVP technique, it is diagnosed when the SDVP is less than 2 cm.⁶ It is an intimidating condition to fetal health for which treatment options are under evaluation and at present not much treatment is available. It is associated with congenital anomalies, increased pregnancy complications, and perinatal mortality. The reported incidence is to be 0.5 to 5%.⁷ Pregnant women with oligohydramnios have more chances of compression of the umbilical cord, passage of meconium by fetus, and decelerations on fetal heart trace with a two-fold increased risk for cesarean delivery and fivefold increased risk for < 7 APGAR score.⁸

In a study conducted, the rate of caesarean delivery in the AFI group was higher as compared to the SDVP group with a P-value=0.017 making it statically significant. 90% of patients were diagnosed with oligohydramnios in the AFI group and 46% in the SDVP group.⁹ But another study reported that the frequency of caesarean delivery was almost equal i.e. 24.7% in AFI and 27.3% in SDVP (p=0.53).¹⁰

The purpose of this study is to create indigenous data comparing both the techniques used for estimation of amniotic fluid volume i.e. AFI and SDVP in their frequency of diagnosis of oligohydramnios. This study may help to avoid unnecessary interventions like induction of labour and caesarean section, especially in low-risk pregnancies.

Materials and Methods

It was a randomized controlled trial. The study was carried out in the Department of Obstetrics and Gynecology, Holy Family Hospital, Rawalpindi over a period of six months from 01-03-2020 to 31-08-2020. The sample was drawn by Consecutive Non-probability Sampling. Pregnant women of age 18-35 years, parity <5, presenting at >37 weeks gestation were included in the study. Pregnancy with the non-cephalic presentation, multiple fetuses, structural or chromosomal fetal malformation, intrauterine growth restriction, intrauterine fetal death, placenta previa, or placental abruption (on ultrasound) were excluded. Also, pregnant women with premature rupture of the membranes, previous caesarean section presenting in active labour, chronic or gestational hypertension (BP≥140/90mmHg), diabetes (OGTT>186mg/dl), thyroid disorder (TSH>5mIU) and asthma were excluded.

After taking approval from the hospital ethical committee, 110 females fulfilling the selection criteria were enrolled in the study from OPD of the Department of Obstetrics/ Gynecology, Holy Family Hospital, Rawalpindi. Written informed consent was taken. Demographic detail including name, age, BMI, parity, and gestational age was noted. Then females were divided into two groups. Group A females were evaluated by using AFI and group B females were evaluated by using SDVP. The patient's scan was done by the senior obstetrician. In the AFI technique, the amniotic cavity was divided into four quadrants and the deepest vertical pocket was measured in each quadrant, the measurements were then added to give an estimated total amniotic fluid volume. A value <5cm was taken as oligohydramnios. In the SDVP group, the image of the deepest cord-free pool pocket was frozen and measured along its maximum length in centimeters. Value <2cm was taken as significant. If a patient is not in labour already then induction of labour was done in both groups meeting respective diagnostic criteria by methods according to the department protocol. Patients were managed according to standard protocol practiced in the department. Caesarean section was performed in case of fetal distress, in presence of meconium-stained liquor, or in case of failure to the progress of labour. The information was recorded on the preformed proforma.

All the data was entered and analyzed through SPSS version 22. All the quantitative variables; like maternal age, BMI, and gestational age standard deviation were

calculated. All the qualitative variables; like parity, diagnosis, induction of labour, and caesarean section frequency and percentages were calculated. To compare the frequency of diagnosis, induction of labour, and caesarean section in both study groups "Chi-square test" was applied. P value ≤ 0.05 was considered significant. Data was stratified for age, BMI, parity, and gestational age. Post-stratification, both groups were compared for caesarean section by using the chi-square test. P value ≤ 0.05 was considered significant.

Results

During the six months study period, a total of one hundred and ten patients (fifty-five in each group) who met the inclusion criteria were included.

18 to 35 years was the range of age in this study with a mean age of 24.90 ± 4.41 years. The mean parity was 1.51 ± 1.52 . The mean BMI was $24.89 \pm 3.29 \text{ kg/m}^2$. The mean gestational age in group A and group B are shown in Table 1.

Table 1: Distribution of patients according to gestational age

GA (weeks)	Group A (n=55)		Group B (n=55)		Total (n=110)	
	No. of patients	%age	No. of patients	%age	No. of patients	%age
37-39	08	14.5	27	49.1	35	31.8
>39	47	85.4	28	50.9	75	68.1
Mean \pm SD	39.20 \pm 1.01		39.10 \pm 1.21		39.20 \pm 1.21	

In my study, oligohydramnios was diagnosed in 19/55 (34.50%) in group A (amniotic fluid index) versus 11/55 (20.0%) in group B (single deepest vertical pocket) (p-value = 0.086), similarly, induction of labour was recorded in 19/55

(34.50%) in group A (amniotic fluid index) versus 11/55 (20.0%) in group B (single deepest vertical pocket) (p-value = 0.086) and caesarean section was recorded in 16/55 (29.09%) in group A (amniotic fluid index) versus 07/55 (12.73%) in group B (single deepest vertical pocket) (p-value = 0.035) as shown in Table 3.

Table 2: Comparison of the frequency of diagnosis, induction of labour, and caesarean section in patients with isolated oligohydramnios diagnosed by amniotic fluid index versus single deepest vertical pocket (n=110)

Outcome		Group A (n=55)		Group B (n=55)		P value
		No.	%age	No.	%age	
Oligohydramnios	Yes	19	34.54	11	20.00	0.086
	No	36	65.46	44	80.00	
Induction of labour	Yes	19	34.54	11	20.00	0.086
	No	36	65.46	44	80.00	
Caesarean section	Yes	16	29.09	07	12.73	0.035
	No	39	70.91	48	87.27	

Out of diagnosed oligohydramnios patients in each group, the rate of caesarean section came out to be 84.2% (16/19) in the AFI group and 63.6% (7/11) in the SDVP group.

Stratification of Oligohydramnios with reference to patients' age, BMI, parity, and gestational age is shown in Table 3.

Table 3: Stratification of Oligohydramnios with respect to age, gestational age, parity and BMI

Effect modifiers		Group A (n=55)		Group B (n=55)		P-value
		Oligohydramnios		Oligohydramnios		
		Yes	No	Yes	No	
Age (years)	18-25	11	23	07	22	0.471
	26-35	08	13	04	22	
GA (weeks)	37-39	04	04	02	25	0.004
	>39	15	32	09	19	
Parity	≤ 2	15	24	07	24	0.155
	>2	04	12	04	20	
BMI (kg/m^2)	≤ 25	12	30	06	20	0.617
	>25	07	06	05	24	

Stratification of induction of labour with reference to patients' age, BMI, parity, and gestational age is shown in Table 4.

Table 4: Stratification of Induction of labour with respect to age, gestational age, parity and BMI

Effect modifiers		Group A (n=55)		Group B (n=55)		P-value
		Induction of labour		Induction of labour		
		Yes	No	Yes	No	
Age (years)	18-25	11	23	07	22	0.471
	26-35	08	13	04	22	0.075
GA (weeks)	37-39	04	04	02	25	0.004
	>39	15	32	09	19	0.983
Parity	≤2	15	24	07	24	0.155
	>2	04	12	04	20	0.518
BMI (kg/m ²)	≤25	12	30	06	20	0.617
	>25	07	06	05	24	0.015

Stratification of caesarean section with reference to patients' age, BMI, parity, and gestational age is shown in Table 5.

Table 5: Stratification of Cesarean section with respect to age, gestational age, parity and BMI

Effect modifiers		Group A (n=55)		Group B (n=55)		P-value
		Cesarean section		Cesarean section		
		Yes	No	Yes	No	
Age (years)	18-25	10	24	05	24	0.258
	26-35	06	15	02	24	0.058
GA (weeks)	37-39	04	04	02	25	0.004
	>39	12	35	05	23	0.442
Parity	≤2	14	25	06	25	0.128
	>2	02	14	01	23	0.326
BMI (kg/m ²)	≤25	09	33	03	23	0.298
	>25	07	06	04	25	0.006

Discussion

Amniotic fluid volume is a useful gauge and predictor of fetal well-being. A rise in the risk of abnormalities in fetal heart rate traces, meconium staining of amniotic fluid, and rate of caesarean sections for fetal distress is linked with oligohydramnios.¹¹ At present, there is no consensus about the effectiveness of different ultrasonographic techniques used for amniotic fluid estimation in predicting adverse perinatal outcomes.¹² We have conducted this study to draw a comparison regarding diagnostic frequency also rate of induction of labour and caesarean section in patients with isolated oligohydramnios as detected by calculating Amniotic fluid index versus single deepest vertical pocket.

In my study, oligohydramnios was detected in 34.50% in group A versus 20% in group B with a significant p-value=0.086. Similarly, induction of labour was recorded in 34.50% in group A versus 20% in group B with a significant p-value=0.086 and caesarean section was recorded in 29% in group A versus 12.73% in

group B with a significant p-value=0.035. Out of diagnosed oligohydramnios patients in each group, the rate of caesarean section came out to be 84.2% in the AFI group and 63.6% in the SDVP group.

One Cochrane review was done including five randomized controlled trials, involving 3226 pregnant women between the years 1997 to 2004. The goal was to determine which of the two techniques (AFI /MVP measurement) for assessing Amniotic fluid volume is more precise in reducing the risk of poor pregnancy outcomes. This review concluded that there is no constant standard for measuring amniotic fluid volume. So more research is needed.¹² The frequency of oligohydramnios diagnosed by the AFI method was 8% while it was 1% using the SDP method as studied by Maggan EF et al¹³ Rosati et al¹⁴ stated the incidence of oligohydramnios was 4.47% and 3.75% when AFI and SDVP method used respectively.

The selection criteria may be a reason for the difference between our study and other studies. The difference in frequency of oligohydramnios is noted when different methods are employed i.e. between SDVP and AFI methods, resulting in unnecessary

interventions which on one hand may not lead to any improved neonatal outcome but on the other hand do lead to a rise in maternal and perinatal morbidity. AFI is used commonly in the estimation of amniotic fluid volume and its categorization despite the fact that SDVP seems to be better practice for calculating amniotic fluid volume.¹⁵ In one study, Moore¹⁶ diagnosed 9.6% of women with oligohydramnios using the AFI measurement while this incidence was 4% with the SDVP technique. AFI had identified more pregnancies with oligohydramnios than the SDVP technique in this study. Following trials reached differing conclusions when a comparison between the two methods was made in predicting pregnancy outcomes. Some reported AFI as being the better test,¹⁷ some stated SDVP as the better option¹⁸ and in other studies, neither test was superior to the other when it comes to the identification of perinatal complications.¹⁹ Nabhan AF in their study stated that the AFI method for measuring amniotic fluid volume nearly doubles the risk of induction of labour.²⁰ In a study by Noor N et al, a total of 140 pregnant women were included and divided into two groups based upon the estimation of amniotic fluid volume either by AFI method or by measuring MVP. In Group Ia, 59 women (65.56%) out of 90 women went into spontaneous labour while 31(34.44%) had induction of labour. In Group Ib, based on oligohydramnios that is diagnosed based on decreased AFI but normal MVP, 50(100%) women had undergone induction of labour. Therefore they concluded that AFI measurement gives rise to the rate of diagnosis of oligohydramnios and induction of labour.²¹ Rossi and Prefumo did a meta-analysis and it was found that obstetric interventions occurred more frequently in the isolated oligohydramnios than normal amniotic fluid (AF) group (IO: 89/679, 13% vs. normal AF: 166/3354, 5%; OR: 2.30; 95% CI: 1.00-5.29).²² Therefore, presently selection of techniques is based on local protocols and clinical predilection. Therefore, we can infer from the present study that the frequency of diagnosis, inducing labour, and performing caesarean section in patients with isolated oligohydramnios detected by AFI (amniotic fluid index) method is higher as compared to the single deepest vertical pocket which is being supported by other studies.

Conclusion

This study concluded that the frequency of diagnosis, induction of labour, and caesarean section in patients with isolated oligohydramnios diagnosed by an

amniotic fluid index is higher as compared to a single deepest vertical pocket. So, we recommend that the single deepest vertical pocket SDVP method is a superior choice as compared to the AFI method for estimation of amniotic fluid volume as its use avoids unnecessary interventions, especially in low-risk pregnancies. It is therefore related to improved maternal and fetal outcomes.

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Erratum

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