ORIGINAL RESEARCH PAPER

Radiodiagnosis

AMNIOTIC FLUID INDEX VERSUS MAXIMUM VERTICAL POCKET MEASUREMENT IN PREDICTING OUTCOME AT 40 WEEKS OR BEYOND

KEY WORDS: Amniotic fluid index, Maximum vertical pocket, Oligohydramnios, LSCS

Dr. Avinash Gupta Professor, Department of Radiodiagnosis, JLN Medical College, Ajmer

Dr. Reena Mathur* Senior professor & HOD, Department of Radiodiagnosis, JLN Medical College, Ajmer *Corresponding Author

Dr. Deepak Gupta Resident doctor, Department of Radiodiagnosis, JLN Medical College, Ajmer

ABSTRACT

Background: Aim to compare the use of amniotic fluid index with maximum vertical pocket for predicting perinatal outcome. **Method:** The study was a prospective observational study and include 100 normal antenatal women at gestational age 40 weeks or beyond (by last menstrual period/first trimester scan) and between 20 to 40 years of age were enrolled in this study from 2018 to 2019. After taking a detailed history and examination of women, were subjected to ultrasonography for amniotic fluid index (AFI) and maximum vertical pocket (MVP), the women were divided into two Groups: Group I – 62 women having normal AFI and normal MVP : and Group II – 38 women having decreased AFI and normal MVP. **Result:** In Group I 22 women were induced and in Group II 38 women were induced for oligohydramnios. 45 women had normal vaginal delivery versus 17 women had under gone LSCS in Group I. While in Group II, 24 women versus 14 women had vaginal delivery and LSCS respectively, higher rate of LSCS was observed in Group II. There was no significant difference in rate of LSCS for fetal distress between Group I & II. **Conclusion:** Amniotic fluid index (AFI) compared with the maximum vertical pocket (MVP) excessively characterizes patient as having oligohydramnios, leading to an increase in obstetric intervention, without any documented improvement in perinatal morbidity and mortality. Thus, there is no reason found to favour AFI over MVP.

INTRODUCTION

Assessment of amniotic fluid volume (AFV) is an integral part of antenatal ultrasound evaluation during screening exams, targeted anatomy examinations, and in tests assessing fetal well-being. Abnormal AFV has been associated with an increased risk of perinatal mortality and several adverse perinatal outcomes, including premature rupture of membranes (PROM), fetal abnormalities, abnormal birth weight, and increased risk of obstetric interventions by Harman CR.1 The ultimate goal of antepartum surveillance program is to improve perinatal outcome and to decrease intrauterine fetal demise besides prevention of maternal morbidity and mortality by Yeo et al, Liston R et al.2,3 A fetus in distress should be identified at the earliest so that timely delivery will not only salvage the fetus but also prevent long term neurological impairments such as injury to fetal central nervous system by Baschat AA et al.4 These risk increases from the expected date of confinement (40 weeks of gestation) as placental insufficiency and postmaturity (greater than 42 weeks of gestation) are associated with an exponential increase in the risk of perinatal death by Bergjsø.5 Delivery beyond 42 weeks is associated with a fourfold increase in death in utero, as well as a threefold increase in neonatal death compared with delivery at term by Crowley P.6 In addition to mortality, there is an increased risk of meconium aspiration syndrome, neonatal seizures and long term handicap by Minchom P.7 Amniotic fluid assessment by ultrasound is one of the important tools in assessing the fetal health in all risk categories especially beyond the period of viability by Nash P.8

METHODS

Inclusion criteria -

- The study includes 100 pregnant women with known last menstrual period, singleton pregnancy, gestational age from 40 weeks or beyond and aged between 20 to 40 years.

Exclusion criteria -

- History of gestational hypertension, diabetes mellitus, intrauterine growth restriction, hydrops fetalis, twins, polyhydramnios and premature rupture of membrane.

After taking detailed history and examination all women provided an informed written consent and underwent ultrasound evaluation for Amniotic fluid index (AFI) and Maximum vertical pocket (MVP).

- The women were divided in to two groups based on measurement of AFI and MVP ultrasonographically Group I-women having normal AFI and normal MVP.

Group II -women having decreased AFI and normal MVP.

ULTRASONOGRAPHY

- Single maximum vertical pocket (MVP) technique involves finding the single largest pocket of amniotic fluid on USG, free of cord and fetal parts and than measuring the greatest vertical dimension (fig 1)with the ultrasound transducer perpendicular to the floor.

The amniotic fluid index (AFI) technique is based on division of the uterus into 4 equal quadrants and measuring the deepest vertical pocket of fluid in eachquadrant. (fig2)

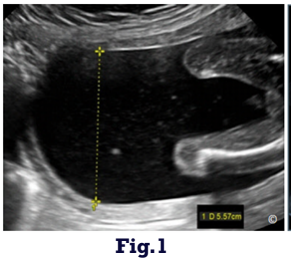

Fig.1

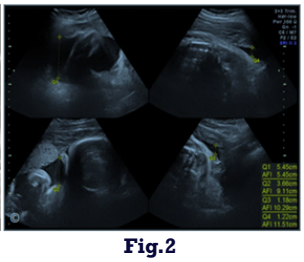

Fig.2

- Most radiologists measure the MVP and AFI in amniotic fluid pockets that are at least 1cm in width and free of cord and foetal parts.
- The correlation of amniotic fluid index and maximum vertical pocket with perinatal outcome were computed for two groups.

- **The primary outcome measures were -**
- Presence of meconium.

- Rate of diagnosis of oligohydramnios.
- APGAR score at 1 and 5 minutes.
- Birth weight.
- Admission to NICU (neonatal morbidity and mortality).
- The secondary outcome were-
- Induction of labour
- Mode of delivery and rate for caesarean section for foetal distress

RESULTS

- In present study 100 antenatal women were included after fulfilling the inclusion and exclusion criteria.
- The women were divided into 2 groups based on measurements of AFI and MVP ultrasonographically.
- Maternal baseline characteristics were similar between two groups in term of age, parity and gestational age (TABLE 1)

Table 1: Demographic profile of the studies subjects

Parameters	Group I (n = 62)	Group II (n = 38)	P-value
Age(years) (Mean + SD)	24.6 ± 4.1	24.06 ± 2.98	0.57
Gravidity			
Primi	26 (43.5%)	16 (42%)	0.9
Multi	36 (56.5%)	22 (58%)	0.9
Gestational age			
≥40 weeks	46 (74.2)	28(73.68)	
≥41 weeks	9(14.5)	7 (18.42)	
≥42 weeks	7 (11.3)	3(7.89)	

Table 2: Rate of diagnosis of oligohydramnios and induction of labour

Induction of labour	Group I (n=62)		Group II (n=38)		P-value
	No.	%	No.	%	
Yes	22	35.48	38	100	0.0001
No	40	64.52	00	00	0.0001
Total	62	100	38	100	

AFI increases the rate of diagnosis of oligohydramnios and labour induction (Table 2).

Table 3: Mode of delivery

Mode of delivery	Group I (n=62)		Group II (n=38)	
	NO.	%	NO.	%
Vaginal Delivery	45	72.58	24	63.15
LSCS	17	27.42	14	36.85
Total	62	100	38	100

$\chi 2=1.02, p=0.312$

It was observed that group I and group II had no significant difference in mode of delivery (Table 3)

Table 4: Indication for LSCS

Indication for LSCS	Group I		Group II	
	No.	%	No.	%
Fetal Distress with MSAF	6	35.29	7	50
Fetal distress with non reassuring CTG	6	35.29	4	28.57
NPOL	3	17.64	2	14.28
Failed Induction	2	11.78	1	7.15
Total	17	100	14	100

$\chi 2=1.99, p=0.15$

As shown in Table 4, there was no significant difference in the rate of LSCS for fetal distress (p=0.15)

Table 5 : Neonatal outcome

Neonatal outcome	Group I	Group II	P value
• Birth Weight	2.96	2.99	0.6
Meconium	7	8	0.1
APGAR score <7 at 5 min.	0	0	0.9
NICU admission	1	1	0.7
MAS	0	0	00
Neonatal morbidity and mortality	1	1	0.7
Perinatal death	1	1	0.7

There was no significant difference between the birth wt. of two groups.

- There was no significant difference between the groups for APGAR score (p=0.9).
- There was no statistical difference between the groups (p=0.7) (Table 5)

DISCUSSION :

- IN GROUP I, out of 62 women about 22 (35.48%) were induced and 40 (64.52%) women spontaneously progressed into labour.
- In group II, 38 (100%) women were induced for oligohydramnios diagnosed on the basis of decreased AFI(<5cm) and had normal MVP (≥2cm).
- present study is in accordance with AF Nabhan and Kehl S et al and they also concluded that use of AFI increased the rate of diagnosis of oligohydramnios and labour induction for oligohydramnios without improving perinatal outcome in comparison to MVP and also stated that AFI method for foetal surveillance almost doubles the risk for induction of labour.
- It was observed in comparing group I and II that there was no significant difference in mode of delivery, present finding are in accordance with Kehl s et al.
- Also there was no significant difference in the rate of LSCS for foetal distress and presence of meconium and birth weight & Apgar score at 1 and 5 min. between two groups.

CONCLUSION :

Amniotic fluid index compared with the maximal vertical pocket excessively characterizes patients as having oligohydramnios, leading to an increase on obstetrics interventions, without any documented improvement in perinatal mortality and morbidity. However there is no significant difference in predictability of caesarean section for fetal distress, low APGAR score. Thus does not find any objective reason to favour AFI over MVP.

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