

Original article:

Intrapartum amniotic fluid index assessed in term pregnancy and it's fetal outcome

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ABSTRACT

Background: Oligohydramnios in the antenatal period has been associated with increased fetal morbidity and abnormal antepartum fetal heart rate patterns. The purpose of the study was to determine the value of routine intrapartum amniotic fluid assessment on perinatal outcome

Methods: An observational study was done on 200 term pregnant women who were admitted for labour and delivery, who had an intrapartum A.F.I determined by four quadrant technique and who delivered in same hospital .Oligohydramnios was defined as A.F.I<5 (N=41), borderline as A.F.I 5.1-8cm (n=39), normal as A.F.I 8.1-24(n=120) women with A.F.I > than 24cm were not included .The three group were compared with regard to intrapartum and post- partum variables.

Results : instrumental deliveries .cesarean delivery for fetal distress ,low A.P.G.A.R scores at 1 and 5 min's ,N.I.C.U admission occurred more often in oligohydramnios group .The efficacy of intrapartum determined oligohydramnios predicting cesarean delivery for fetal distress gave a sensitivity of 62.8%,specificity of 88.4%,positive predictive values of 53.6% and negative predictive value of 91.82%

Conclusions: A.F.I< 5 cm is associated with high incidence of, Fetal distress, instrumental delivery and cesarean section, poor APGAR and high incidence of N.I.C.U admission. Intrapartum AFI estimation for oligohydramnios is a valuable screening test for predicting subsequent fetal distress requiring caesarean delivery

Keywords:, A.F.I, Intrapartum amniotic fluid volume , fetal distress, oligohydramnios,

Introduction:

Oligohydramnios in the ante partum period has been associated with intrauterine growth restriction ,post-dated pregnancy ,congenital anomalies ,increased fetal morbidity and abnormal antepartum fetal heart rate patterns⁻¹ Amniotic fluid index was described by phelan in 1987. It is the most accurate method for assessing amniotic fluid volume and helps categorise the patients into normal .low normal and oligohydramnios group⁻² U.S.G examination including measurement of A.F.I as an admission test for women presenting at labour ward after an uneventful ante natal period , could identify patients at risk of fetal distress and thus detect cases needing special attention and meticulous surveillance .this is superior to the ante partum risk assessment because an immediate evaluation of the current fetal condition could be obtained³

In1987 a semi-quantitative sonographic assessment of AFV was developed know as A.F.I ⁻³.this involves the summing of maximum vertical pocket in each of four quadrants of uterus .the original study conducted on 197 patient from 12 to 42 weeks period of gestation indicated that the mean amniotic fluid index increased from 7cm

to 20cm until 20 weeks, and then plateaued at approximately 16cm for remainder of gestation. The study defined cut offs for A.F.I as shown below

DIAGNOSTIC CRITERIA FOR A.F.I⁻³

AF VOLUME	A.F.I VALUES
Oligohydramnios	<5cm
Low normal	5.1 – 8 cm
Normal	8.1-24 cm
Polyhydramnios	>24 cm

The investigator recommended that labour induction be considered in patient with oligohydramnios to reduce the increased risk of fetal morbidity .the likelihood of low A.F.I (<5) BETWEEN 36-40 weeks of gestation was 2.4 %⁻³

The 5th percentile that is an amniotic fluid index between 7.1-9.7 cm was suggested to be cut off for the detection of oligohydramnios⁴. The mean A.F.I value for given gestational age is similar in reports of Rutherford et al⁻⁵ and Moore and Cayle⁻⁴ . however the range of values for gestational age vary for example a value of 5cm is at 2.5th percentile before 41 weeks gestation for Phelean et al⁻² and it is just below the first percentile in Moore and Cayle's study⁻⁴, therefore, the wide spread use of an A.F.I of 5 cm as the cut off between oligohydramnios and others is done

In study by Jeng CJ ,Lee JF, Wanf KG⁻⁶ it was noted that pregnancies with A.F.I<8 had higher incidence of meconium staining, cesarean section for fetal distress abnormal fetal heart rate tracing and APGAR scores <7 at 1 min⁻⁶

Subjects and Methods:

200 cases admitted for labour and delivery were selected on the basis of simple random sampling technique in Padmashree Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pune in 2019 -2020 . For all the selected cases through history and examination was done, for all the women ultrasound examination was done and A.F.I was determined by four quadrant method ,if A.F.I was found < than 10 ,three A.F.I values were calculated and average of it was taken the result of A.F.I were blind to the physician managing the patients labour

Inclusion criteria

- Pregnant women with gestational age more than 37 weeks and less than 42 weeks
- Singleton pregnancy
- Patient in true labour pains with membrane intact
- Cephalic presentation
- A.F.I assessed by ultrasound
- They should have delivered during the same hospitalization when A.F.I was determined

Exclusion criteria

- < 37 weeks & > 42 weeks
- Known fetal malformation/anomalies,
- Ruptured membranes
- Multi- fetal gestation,

- Polyhydramnios (i.e. cases with A.F.I >24 cm)
- Patient with previous L.S.C.S
- Abnormal presentation
- Medical disorder like diabetes mellitus P.I.H, anemia, renal disease, liver & cardiac disease

Study protocol

The data was collected in a proforma .Various outcome measures & recorded were, gestational age at delivery, parity, , mode of delivery , indication for cesarean section& instrumental delivery , APGAR score at 1 min and 5 min , admission to neonatal ward .fetal distress in present study was defined as persistent fetal heart on auscultation < 110 or> 160 beats per minute.

Data analysis & Statistical Analysis

Descriptive data are presented as number and percentages with mean and standard deviation wherever required S.S.P (Smiths’s statistical Package) software was used to calculate statistics .Chi-square test was used for analysis categorical data . Students “T” test was used for comparing mean between two groups. A p- value of 0.05 or less was considered statistically significant

Diagnostic validity test was performed to predict L.S.C.S done for fetal distress using intra-partum A.F.I

Results :

Table I. Distribution of Cases among different Groups

group	A.F.I	Frequency	Percent
i	<5-oligohydramnios	41	20.5
ii	5.1-8-borderline	39	19.5
iii	8.1-24 -normal	120	60

20.5%of women were in oligohydramnios group, 19.5% in borderline group and 60% in normal group

Table II. Gestation age relationship to amniotic fluid index

Age in weeks	Group I (oligohydramnios)	%	Group II (borderline)	%	GROUP III (normal)	%
37-40	17	41.46	20	51.28	97	80.83
40-42	24	58.53	19	48.71	23	19.6
TOTAL	41	100	39	100	120	100

$X^2=26.83$ $p < 0.05$, S

Gestational age distribution in 3 group had a chi square value of 26.83 with a p value of <0.05 which is statistically significant

Table III. Number of instrumental deliveries among 3 different group.

groups	N	Instrumental delivery	%
Group i	41	5	12.1
Group ii	39	5	12.8
Group iii	120	8	6.6

Percentage is calculated for the corresponding sizes of each group's hence the total is not 100%. This indicated that the incidence of instrumental delivery was high among oligohydramnios and borderline group of women in present study.

Table IV. Indication for emergency cesarean delivery in 3 different groups

indication	Group I	%	Group II	%	Group III	%
Fetal distress	22	53.6	10	25.6	3	2.5
other	2	4.8	2	5.1	4	3.3
total	24		12		7	

TABLE IV, it indicates a high incidence of cesarean delivery for fetal distress in oligohydramnios group

Table V. Table showing mode of delivery in different group

group	Normal delivery	%	Instrumental delivery	%	Cesarean delivery	%
I (N-41)	12	29.26	5	12.1	24	58.5
II (N-39)	22	56.4	5	12.8	12	30.7
III (N-120)	105	87.5	8	6.6	7	5.8

$\chi^2=59.3$ P< 0.05, SIGNIFICANT

Among the 41 women in group I 29.26% had Normal delivery, 12.1% instrumental and 58.5 % cesarean delivery.

In the 39 women in group II, 56.4 % had normal 12.8 % instrumental and 30.7 % cesarean

Among the 120 women in group III, 87.5 % normal ,8 % instrumental and 5.8 % cesarean

The difference in the mode of delivery was found to be statistically significant between three group (p<0.05)

Table VI. Table showing A.P.G.A.R score <7 at 1 and 5 min's among different groups

groups	A.P.G.A.R scores < 7 at			
	1 MIN	%	5 MIN	%
Group I	25	60.9	18	43.9
Group II	14	35.8	8	20.51
Group III	6	5	4	3.3
I v/s II v/s III	X=59.8 p<0.05,significant		X=40.6,p<0.05,significant	

From table VI, the incidence of low A.P.G.A.R (<7) at 1 min was high among oligohydramnios and borderline group of women

The difference in the value of APGAR scores between 3 groups at both 1 and 5 min was statistically significant

TABLE VII INCIDENCE OF N.I.C.U ADMISSION IN DIFFERENT GROUP

GROUPS	N	NUMBER OF PATIENTS	PERCENTAGE
GROUP I	41	19	46.34
GROUP II	39	5	12.82
GROUP III	120	4	3.33

Percentage is calculated for the corresponding sizes of each group .hence the total is not 100%

N.I.C.U admission in different groups had a chi-square of 47.0 and p value <0.05 which was statistically significant ($X^2=47.0$, $p < 0.05$. significant)

Oligohydramnios and borderline group of women were associated with more morbidity compared to other group

Table VIII results by using A.F.I as screening test

Screening test	L.S.C.S for fetal distress		
	+	-	total
<5	22	19	41
>5	13	146	159
total	35	165	200

Sensitivity 62.8%,specificity 88.48%,positive predictive value 53.66%negative predictive value91.82%,accuracy 84%.

Discussion

Amniotic fluid volume is known to reduce with advancing gestational age. In the present study, 58.3% of women among oligohydramnios group 48.71% among borderline group and 19.16% among normal group were seen with gestational age in between 40-42 weeks. In present study incidence of cesarean delivery for fetal distress was 53.6% among oligohydramnios group. This is comparable with study by Raj Sriya et al⁷., (43.05%) it is also comparable with Rukhsana Karim et al⁸.,(42%) and Preshit Chate et al⁹.,(64%)

Among borderline group 25.6 % of women had fetal distress in present study. This is comparable with study conducted by A Jamal et al.¹⁰, (26.3%) in the present study 2.5 % of women in normal group had fetal distress which is comparable with the study conducted by Sarno et al.¹¹,(2.5%) Alchalabi et al.¹², conducted a study (n-180) and found out that the incidence of L.S.C.S for fetal distress was high in oligohydramnios group. Guin G,Punekar et al¹³., in there study came to conclusion that oligohydramnios has high incidence of LSCS for fetal distress and APGAR <7 in 1 minute . Chauhan SP, Sanderson M.et al¹⁴., conducted a meta-analysis on 10552 patients and concluded A.F.I <5 was associated with increased chance of LSCS foe fetal distress and low APGAR score at 5 minute

In present study APGAR score <7 at 1 min was seen in 60.9% of cases among oligohydramnios group ,30% in study conducted by Rutherford et al⁵., and 38.88 in the study conducted by Raj Sriya et al⁷., and 26.2% by Sarno et al¹¹ and 30% by Preshit Chate et al⁹ In the present study APGAR score <7 at 5 min was seen in 43% of cases among oilgohydraminos , 20.51 % among borderline group . Among normal group 3.3%women had AFGAR score <7 at 5min which is comparable with study conducted by Rutherford et al.,(2%)⁵

Locatelli A et al¹⁵ in their study also came to the result that oligohydramnios has adverse perinatal outcome. In present study the incidence of NICU admission among oligohydramnios group was 46.34% in the study conducted by Preshit Chate et al.⁹, it was 42 % comparable with present study. Thus amniotic fluid index measurement can be a useful adjunct to other fetal surveillance method. A.F.I < 5 cm is associated with high incidence of, fetal distress, instrumental delivery and cesarean section, poor APGAR and high incidence of N.I.C.U admission. Thus intra-partum assessment of amniotic fluid index is better than ante partum fetal assessment.

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