Original Article

BORDERLINE AMNIOTIC FLUID INDEX AND CAESAREAN SECTION FREQUENCY IN FULL-TERM PREGNANT PATIENTS PRESENTING TO A TERTIARY CARE HOSPITAL

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Abstract

Background: The optimal approach to borderline Amniotic fluid index (AFI) in pregnancy is uncertain, sparking ongoing debate and controversy. This study primarily aimed to determine the frequency of cesarean deliveries in term pregnancies with borderline AFI in our clinical setting.

Material & Methods: A cross sectional descriptive study conducted in Unit I of Obstetrics and Gynecology Department of Jinnah Hospital, Lahore, from January 2023 to June 2023. Total 90 pregnant women were selected through non probability consecutive sampling. Patients between 37 to 41 weeks with borderline were included. The cut-off values for the AFI were defined as AFI of 0-5 cm labelled as low fluid, 5.1 to 8 cm as borderline and greater than 8 cm as high fluid value, 5, 16 After complete clinical evaluation, labour induction was done with Prostaglandin E2 gel vaginally, 6 hours apart two doses. All patients monitored during labour and tracked until delivery. Key outcome variable was rate of Caesarean section performed for unsuccessful induction of labour. All data was entered in SPSS version 22.

Results: Out of 90 patients, mean age was calculated as 28.53±5.99 years. Mean gestational age was 38.47±1.08 weeks and mean AFI was 6.62±0.93 cm. Cesarean section done for unsuccessful induction of labour in 27.8 % (n=25) of women having borderline AFI while successful vaginal birth observed in 65 patients (72.2%).

Conclusion: In our clinical environment, the rate of caesarean section is not substantially elevated in women with borderline AFI at term that experienced failed induction.

Keywords: Amniotic Fluid, AFI, Cesarean Section, full term

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INTRODUCTION

An appropriate amount of amniotic fluid is very important in pregnancy, as enough amount of amniotic liquid allows the gestational events to progress normally from four months onwards[1]. Amniotic Fluid Index (AFI) was first described in 1987. Since then, it has been accepted as a validated tool for the accurate amniotic fluid estimate[2]. Monitoring amniotic fluid volume in conjunction with a non-stress test is a frequently employed technique to assess fetal well-being in high-risk pregnancies[3]. Oligohydramnios affects 3-5% normal pregnancies and it is associated with induction of labour[4]. Amniotic fluid index is determined

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using ultrasonography and all quadrants of the abdomen are examined and summed up[2]. The AFI below 5 is considered as oligohydramnios, borderline when the value of AFI is 5 to 8 cm and is taken as normal when value is 8.1 to 24[5]. The cut-off values for the AFI were defined as AFI of 0-5 cm labelled as low fluid, 5.1 to 8 cm as borderline and greater than 8 cm as high fluid value[5,6]. It can be projected that both borderline and low AFI is associated with feto-maternal morbidity. There are more chances of fetal distress, low Apgar score, growth retardation and increased chances of cesarean section[6]. According to various studies, fetomaternal outcomes remain largely consistent between individuals with normal AFI and those with borderline AFI[7]. Literature observes that incidence of failed induction of labor and need for operative birth including cesarean section is significantly high in pregnant woman with borderline AFI[8]. Borderline AFI is associated with adverse fetomaternal morbidity and mortality[9]. Cesarean delivery showing a rising trend globally, has its own set of complications and morbidities. Prompted by a perceived and worrying trend of undue labour inductions in borderline AFI pregnancies, frequently culminating in failed inductions and operative births, this study investigated this phenomenon in our healthcare context. The primary objective was to determine the frequency of cesarean deliveries in term pregnancies with borderline AFI to assess whether elevated rate of operative deliveries for borderline AFI is prevalent in our clinical setting, eventually addressing concern of rising rate of operative birth.

MATERIALS AND METHODS

A cross sectional descriptive study was conducted in Unit I of Obstetrics and Gynecology Department of Jinnah Hospital, Lahore, from January 2023 to June 2023 after approval from institutional ethical board. Total of ninety pregnant women were selected through non probability consecutive sampling, full filling the inclusion criteria. Patients having gestational age between 37 to 41 weeks according to last menstrual period and/or dating scan and having borderline AFI 5-8 cm defined a borderline by an expert obstetric ultrasound done after 36 weeks of gestation were included in the study[5,16]. Phelan et al defined borderline AFI as between 5 and 8 cm and Gumus and Miller have defined a borderline AFI as an AFI of 5.1-10[16,17]. We defined borderline AFI according to Phelan et al. Pregnant patients having any co morbidity including hypertension, diabetes mellitus, chronic renal or liver disorder, autoimmune diseases or gestational hypertension or gestational diabetes in medical and scarred uterus in obstetric history were excluded from this study. In addition to basic demographic data, parity and gestational age were noted. After an informed consent a detailed demographic and clinical profile was collected on a pre-designed performa and ultrasound examinations was performed. All patients were assessed for induction of labour as per standard guidelines and protocol in the department. After completing clinical evaluation, and necessary preparation for emergency Caesarean section in case need arise, labour induction was done with Prostaglandin E2 gel vaginally, 6 hours apart two doses, in the morning hours between 6 to 11 am (on non-emergency days of the unit). All patients were monitored during labour as per WHO labour care guide protocol, routine practice in the department for laboring women and labour tracked until delivery. Pregnancy outcome was noted in terms of mode of delivery. Caesarean section was performed for unsuccessful induction of labour or passage of meconium or CTG category II or III changes persisting for more than or equal to 2 minutes in a for 10 minutes trace. Standard pre- and postoperative and postnatal care was provided to all patients after delivery. Information was entered into a pre-designed Performa for documentation and all data entered in SPSS version 22.0 The quantitative variables like age, gestational age and AFI were expressed as mean and standard deviation. The frequency and proportions of qualitative variables such as parity and mode of delivery were calculated.

Data was stratified for effect modifiers like age, gestational age, and parity and post stratification Chi-square test was applied for any statistical significance. A p-value ≤ 0.05 was considered as statistically significant.

RESULTS

A total of 90 booked and unbooked cases having borderline AFI on expert obstetric ultrasound were enrolled. The data were statistically described in terms of mean, ± standard deviation (±SD), percentages and frequencies. Data stratified for age, gestational age and parity. Analysis of the age distribution showed in Table 1. Mean gestational age was 38.47±1.08 weeks and mean AFI was 6.62±0.93 cm. Mean parity was calculated as 2.31±0.90. (Table No. 1). Frequency of cesarean section was 27.8 % in full term pregnancy with borderline AFI and 72.2% had SVD. Caesarean section was done on failed induction of labour with prostaglandin E2. A statistically significant result was found for mode of delivery with age and parity. ($p < .05$). Stratification for gestational age showed a non-significant relationship with mode of delivery. ($p > .05$). (Table No. 2).

Table 1: Demographic and Obstetrics profile of patients (n =90)

Variables n = 90	Frequency	Percent	Mean ± SD
Age (Years)			
18-30	55	61.1	28.53
31-45	35	38.9	± 5.99
Gestational Age (Weeks)			
37-40	78	86.7	38.47
> 40 - 41	12	13.3	± 1.08
Parity			
1-2	76	84.4	2.31 ±
3-4	14	15.6	0.90

Table 2: Mode of birth and age, gestational age and parity cross tabulation (n=90)

Variables n = 90	Mode of Delivery				P-value
	LSCS n= 25		SVD n =65		
Age (Years)					
18-30 years	20	(22.2%)	35	(38.9%)	0.023
31-45 years	5	(5.6%)	30	(33.3%)	
Total	25	(27.8%)	65	(72.2%)	
Gestational age (weeks)					
37-40	21	(23.3%)	57	(63.3%)	0.644
40 1 to 41 weeks	4	(4.4%)	8	(8.9%)	
Total	25	(27.8%)	65	(72.2%)	
Parity					
1-2	25	(27.8%)	51	(56.7%)	0.012
3-4	0		14	(15.6%)	
Total	25	(27.8%)	65	(72.2%)	

DISCUSSION

The Amniotic Fluid Index (AFI) is a critical component of the fetal biophysical profile, playing a significant role in predicting pregnancy outcomes and mode of birth[3]. Extremely low AFI values are associated with intrauterine growth restriction and fetal renal anomalies, perinatal morbidity and mortality[6]. Monitoring amniotic fluid levels during pregnancy is essential, as fluctuations in AFI can indicate potential complications[10]. Oligohydramnios, a condition characterized by low amniotic fluid levels, affects approximately 1-5% of pregnancies and often necessitates labor induction[8]. The AFI is a commonly used method for assessing oligohydramnios, first introduced by Phelan in 1987, AFI is now an established tool for accurately estimating amniotic fluid volume[5]. AFI below 5 is considered as low, borderline when 5 to 8 cm

and is taken as normal when value is 8.1 to 24 cm[5]. It is evident in literature that both borderline and low AFI are associated with feto-maternal morbidity. There are more chances of fetal distress, low Apgar score, growth retardation, failure of induction and increased chances of cesarean section in cases with borderline and low AFI.[6, 8.] Cesarean delivery showing a rising trend globally, has its own sets of complications and morbidities. Although the risks associated with borderline AFI are established, the growing concern of increased operative birth rates in this group necessitates additional research. The existing evidence on Caesarean section rates in women with low AFI is contradictory, with some studies indicating increased surgical intervention, while others suggest favorable outcomes for vaginal deliveries, similarly no consensus for optimal approach of management for such pregnant women is available[9].

In this study, overall cesarean section rate observed was 27.8% (n=25), and when we compare cesarean section with respect to age, we found that frequency of C-section was higher (22.2%) in age group of 18-30 years of age as compared to another group 5.6%. (P = 0.02). We compare cesarean section with respect to gestational age we found that frequency of C-section was higher (23.3%) in gestational age group of 37-40 weeks as compared to another group 4.4%. (P-value 0.64). In the current study, significant results were observed (p-value 0.01) when comparing cesarean section rates across different parity groups. The frequency of C-sections was notably higher (23.3%) in the parity group of 1-2, compared to 0% in other groups. Rate of caesarean section in our study group was significantly lower than vaginal birth while many studies in the literature reveal a persistent trend of elevated caesarean section rates among patients with borderline AFI, surpassing vaginal delivery rates[11]. Other studies show that there is no difference between normal and borderline AFI patients in terms of fetomaternal outcomes[12]. Patients with borderline AFI may have increased chances of failure of induction at term. Failed induction of labour at term is one of the common indications for cesarean section[13,14].

Maternal outcomes such as preterm delivery, meconium-stained liquor, and lower segment cesarean section in women with borderline AFI were significantly higher ($p \leq 0.001$). The borderline AFI group had a higher rate of perinatal complications such as Apgar score of <7 ($p = 0.001$)[15]. Our study showed a significant finding for LSCD with parity among patient with borderline AFI. ($P < .012$). Findings suggest that, in our clinical environment, the rate of caesarean section is not substantially elevated in women with borderline Amniotic fluid index who experience failed induction of labour at term and is comparable to the evidence in literature. Moreover, the results provide evidence to the current clinical approach and rightful decision making for induction of labour in situations with borderline AFI being followed in our department while continuing close observation and fetomaternal surveillance.

AUTHORS CONTRIBUTION:

FS: Study Conception, Methodology, Data Analysis, Writing Results & Discussion
SW: Revision of Manuscript
SA: Literature Search & Manuscript Preparation
AI: Data Collection & Preparation of First Draft
SZ: Literature Search, Manuscript Preparation
AK: Write Up of Introduction, Preparing Tables from Results

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