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Frequency of Need for Induction of Labour among Pregnant Women with Anterior Placenta Presenting: A Tertiary Care Experience

Alisha Pasha,[1] Shamsa Arshad Butt,[2] Kiran Iqbal,[3] Nabiha Iqbal,[4] Sadia Ilyas,[5] Iram Iqbal[6]

ABSTRACT

Background & Objective: The placenta, which is typically found at the fundus, anterior, or posterior uterine wall, is an essential organ that supports fetal growth during pregnancy. An anterior placenta is typically regarded as a normal placental position when detected by ultrasound. It may affect the onset of labor, but obstetric complications are not typically caused by it.

The objective of this study was to determine the frequency of need for induction of labour among pregnant women with an anterior placenta presenting at a tertiary care hospital.

Methodology: This retrospective analysis was conducted in the Department of Obstetrics and Gynaecology over a period of six months from 1st May 2024 to 30th October 2024. Pregnant women with ultrasound-confirmed anterior placenta, fulfilling the inclusion criteria, were enrolled after ethical approval and informed consent. Baseline investigations and ultrasound examinations were performed to confirm placental location. Patients were assessed at 40 weeks of gestation for the onset of spontaneous labour. Data regarding maternal age, parity, body mass index (BMI), need for induction of labour, and mode of delivery were recorded using a predefined proforma. Data were analyzed using SPSS version 22. A p-value <0.05 was considered statistically significant.

Results: The mean maternal age was 27.77 ± 4.15 years (range: 18–40 years). The mean BMI was 32.09 ± 3.45 kg/m^2, and the mean parity was 2.06 ± 1.46. Vaginal delivery occurred in 74.4% of cases, while 25.6% underwent caesarean section. Induction of labour was required in 24.4% of women, whereas 75.6% experienced a spontaneous onset of labour.

Conclusion: Anterior placental location is associated with a lower requirement for induction of labour, as the majority of women with an anterior placenta achieved spontaneous onset of labour at term.

KEY WORDS: Induction of labour, term pregnancy, anterior placenta, onset of labour, mode of delivery.

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INTRODUCTION

One of the most common obstetric procedures performed all over the world is the induction of labour (IOL), which refers to the artificial induction of uterine contractions prior to the spontaneous start of labour to end with vaginal birth.[1-3] The induction rate has been reported to be 9-12 percent in certain low and middle-income regions and even higher than that (more than 30 percent) in high-resource hospitals, and almost one in every three labourers is inducted in several countries.[4] This growing tendency is an indicator of increasing tendencies, increased access to pharmacological preparations, especially the prostaglandins, and standardized induction methods.[5] Labour induction is done when the risk of prolonging pregnancy is even more hazardous to both the mother and the fetus than vaginal birth. The most frequent ones are post-term pregnancy, hypertensive disorders, pre-labour rupture of membranes, diabetes mellitus, and other maternal or fetal complications.[6,7] There is evidence to support IOL in post-term pregnancy and hypertensive disorders to improve the perinatal outcomes, but evidence regarding several other indications is scarce or inconsistent.[8,9] In spite of positive outcomes, IOL is linked with such risks as failure to induce, high rates of cesarean section, infection, uterine rupture, and postpartum bleeding, which makes the selection of the patients and close attention paid to their intrapartum progression.[10]

Placental location in front of the womb has become a potentially significant and little- researched independent variable that may affect the onset and progress of labour. A prospective study showed that women with an anterior placenta had an increased rate of induction of labour, especially in post-dated pregnancies, and also a higher rate of caesarean section, long labour, and postpartum complications compared to those with posterior or fundal placental positions. These results indicate that placenta position can influence uterine contractility and labour initiation.[11] The majority of epidemiological investigations that assess the induction of labour do not, however, stratify their results by placental position, and an anterior placenta is not often reflected upon in the counselling or induction planning.[2,3,6]

Correspondence:
Dr. Alisha Pasha
Senior Registrar of Obstetrics & Gynecology,
Ghurki Trust Teaching Hospital, Lahore
Email: alishapasha24@yahoo.com

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High-risk pregnancy cases and complicated inductions are highly represented in the tertiary care hospitals, making them the best place to investigate the association between placental location and induction procedures. Although many studies have been conducted in institutions to assess the prevalence and outcomes of induction, specific results related to the rate of induction of labour in women with an anterior placenta are scarce, especially locally. Placental location is regularly determined in terms of antenatal ultrasonography, but the influence of this element on labour starting is frequently neglected. There is some limited evidence that anterior placental location can be linked with delayed onset of labour and the necessity to induce labour more often; however, there is limited local data. Therefore, this study was conducted to determine the frequency of induction of labour among pregnant women with an anterior placenta presenting to a tertiary care hospital and to describe their obstetric outcomes.

METHODOLOGY

This retrospective study was conducted in the Department of Obstetrics and Gynaecology, Ghurki Trust Teaching Hospital over a period of six months after approval of the study synopsis by the institutional ethical committee. A total sample size of 90 pregnant women was calculated using a 95% confidence level and a 10% margin of error, taking the proportion of women requiring induction of labour as 30.7%.[10] The study involved pregnant women aged 18 to 40 years with a gestational age of 39 weeks or more and primigravida or multigravida pregnant women who had an anterior placenta as determined by ultrasonography. Women who were pregnant with two twins, breech presentation, urogenital infection, antepartum bleeding, or who had cervical cerclage were excluded. Following the written informed consent by the patients or their guardians, elaborate medical histories and physical examination, including the determination of gestational age, were conducted.

Laboratory studies were performed as baseline measures, and the location of the placenta was determined through ultrasound. Pregnant age, parity, pre-pregnancy body mass index (BMI), labour induction necessity, and mode of delivery were entered on a pre-set proforma. The researcher measured all the participants at 40 weeks of gestation or higher on the onset of spontaneous labour, and the necessity that caused the induction of labour was established at this age. The management of the patients was conducted according to the standard institutional procedures.

The Statistical Package of Social Sciences (SPSS) version 22 was used in the data entry and analysis. Descriptive statistics were used with qualitative variables (mode of delivery and need for induction of labour) being used as frequencies and percentages, and quantitative variables (maternal age and pre-pregnancy BMI) described as means and standard deviations. Effect modifiers were done by stratification based on maternal age, parity, pre-pregnancy BMI, and mode of delivery. A p-value that was less than 0.05 was taken to be significant.

Table I: Baseline Characteristics and Obstetric Outcomes of Women with Anterior Placenta (n= 90)

Variable	Category / Statistic	Value
Maternal Age (years)	Mean ± SD	27.77 ± 4.15
	Range	18.0 – 40.0
Pre-pregnancy BMI (kg/m²)	Mean ± SD	32.09 ± 3.45
	Range	24.0 – 40.0
Parity	Mean ± SD	2.06 ± 1.46
	Range	0 – 6
Mode of Delivery	Vaginal	67 (74.4%)
	Caesarean Section	23 (25.6%)
Need for Induction of Labour	Yes	22 (24.4%)
	No	68 (75.6%)

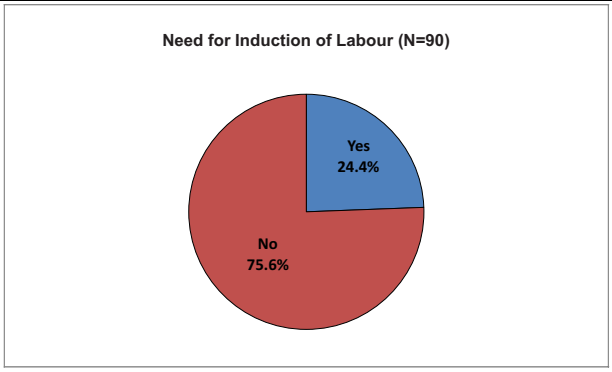

Figure 1: Induction of labour

RESULTS

In this study, a total of 90 pregnant women diagnosed with anterior placental location were included. The mean maternal age was 27.77 ± 4.15 years, indicating that most participants were in the young reproductive age group. The mean pre-pregnancy BMI was 32.09 ± 3.45 kg/m², reflecting a predominantly overweight to obese population. The mean parity was 2.06 ± 1.46, showing that both primigravida and multigravida women were well represented in the study sample. Regarding obstetric outcomes, vaginal delivery was the predominant mode of delivery, occurring in 74.4% of cases, while 25.6% of women underwent caesarean section.

Notably, the majority of women (75.6%) experienced spontaneous onset of labour and did not require induction, whereas only 24.4% required induction of labour at or beyond 40 weeks of gestation. These results indicate that anterior placental location is linked to a comparatively lower requirement for labor induction at term. (Table I)

Table II: Stratification of Need for Induction of Labour According to Maternal and Obstetric Factors (n = 90)

Variable	Category	Need for Induction Yes n (%)	Need for Induction No n (%)	P- value
Maternal Age (years)	18–25	6 (27.3)	18 (26.5)	0.941
	26–40	16 (72.7)	50 (73.5)	
Pre-pregnancy BMI (kg/m²)	≤30	10 (45.5)	27 (39.7)	0.634
	>30	12 (54.5)	41 (60.3)	
Parity	0–2	22 (100)	30 (44.1)	<0.001*
	3–5	0 (0)	38 (55.9)	
Mode of Delivery	Caesarean section	16 (72.7)	7 (10.3)	<0.001*
	Vaginal delivery	6 (27.3)	61 (89.7)	

Stratification analysis showed no statistically significant association between maternal age and the need for induction of labour (p = 0.941). Among women who required induction, 27.3% were aged 18–25 years and 72.7% were aged 26–40 years, which was comparable to those who did not require induction (26.5% and 73.5%, respectively). Similarly, pre-pregnancy body mass index was not significantly associated with the need for induction of labour (p = 0.634). Among women who required induction, 45.5% had a BMI ≤30 kg/m² and 54.5% had a BMI >30 kg/m², compared with 39.7% and 60.3%, respectively, among women who did not require induction.

Parity showed a strong and statistically significant association with the induction of labour (p < 0.001). All women who required induction (100%) belonged to the low-parity group (parity 0– 2), whereas 55.9% of women who did not require induction had a parity of 3–5. Mode of delivery was also significantly associated with induction of labour (p < 0.001). Among women who required induction, 72.7% underwent caesarean section, and 27.3% had vaginal delivery, while among women who did not require induction, 10.3% underwent caesarean section and 89.7% delivered vaginally. (Table II)

DISCUSSION

The human placenta is a complicated organ and has a central role to play in pregnancy.The endometrial implantation of the embryonic implantation occurs at 6-7 days following conception and the uterine sites of the placenta are normally implanted in the upper part of the uterus The placental locations of the uterus were identified in relation to the main placental volume and mass under a sagittal view obtained with a centrally located ultrasonography probe. [11-13] Human placenta is a transient organ during pregnancy whose implantation sites are imperative to its maintenance, embryonic development and labor initiation, by producing sub Placenta performs all the duties of the exchange of all the nutrients, oxygen, and fluid between the mother and the fetus, as well as elimination of fetal waste products. It is also referred to as the diary of gestational life, which is a very apt title. Placenta can also be very beneficial in terms of revealing the cause and time of numerous adverse events and conditions like neurologic injury, fetal distress, infections, intrauterine growth restriction (IUGR), and demise, and the detection of unsuspected maternal disorders and primary placental disorders. [14]

In the current study, the mean age of participants was 27.77 years (range 18–40), and the mean BMI was 32.09 kg/m² (range 24–40). Mean parity was 2.06 ± 1.46 (range 0–6). Most patients (74.4%) had vaginal deliveries, while 25.6% underwent C-section. Labor induction was required in 24.4% of cases, with all inductions occurring in women of parity 0–2 (p<0.001). A significant association was observed between induction and mode of delivery, with 72.7% of induced labors resulting in C-section (p<0.001). Previous studies report varied outcomes based on placental location. A 2013 study found anterior placenta associated with higher induction rates, C-section for labor failure, prolonged third stage, manual placenta removal, and postpartum hemorrhage; however, our results show anterior placenta linked to earlier labor onset and less induction.[14] An August 2001 study in primigravidas found placental location did not affect third-stage labor dynamics. [13] 2013 study found that anterior placenta was associated with higher rates of induction, C-section due to labor failure, protracted third stage, manual removal of the placenta, and postpartum hemorrhage. Still, our findings showed that an anterior placenta was related to earlier labor and reduced induction.[15]

Our cohort, in contrast had relatively low induction need, with only 24.4% of women in our cohort being induced at ≥40 weeks, and 75.6% proceeding to spontaneous labour, indicating relatively low induction need compared to both anterior placenta populations and

in general populations of term, which typically have 15-30 induction rates. The rates of vaginal delivery (74.4 vs 75.5) and caesarean section delivery (25.6 vs 25.5) indicated that the results were similar or even greater than those reported in anterior placenta series, where dysfunctional labour and caesarean section due to failure to progress are more common.[11,17,18] Torricelli et al. conducted the study to explore whether placental location at term is associated with delivery outcome, and the findings indicated that 358(30.7%) females needed induction of labor.[11] There was no significant association between maternal age and BMI and induction ($p = 0.941$ and $p = 0.634$, respectively), but previous studies find that higher BMI levels decrease spontaneous labour and increase induction and emergency caesarean risk, particularly with induced labour.[19]

Induction was found to be strongly linked with parity: all induced women had parity 02, and the vast majority of grand multiparas did not induce. This is in line with strong evidence thatmultiparity is protective against operative delivery and poor outcomes following induction or spontaneous labour.[19,20] Induced women in our cohort were much more likely to deliver by caesarean section, in line with large population data that suggest induction, especially at term and in nulliparas, is associated with increased intrapartum intervention, including caesarean, compared with spontaneous labour. Though randomized and observational studies indicate that in carefully selected low-risk women who have gone through a normal delivery, the elective induction at 39-41 weeks might slightly lower the rates of caesarean section and postpartum haemorrhage, real-world cohorts often indicate higher rates of operative birth and postpartum bleeding following induction.[15-20]

The fact that we found no evidence that the anterior placenta itself was a risk factor in increasing induction and caesarean delivery is contrary to a major prospective study that showed more induction, caesarean, because of failure to progress, extended third stage, manual labour, and postpartum haemorrhage with anterior placentation. One reason is that we did not include placenta previa, accreta spectrum, as well as other high-risk conditions in our study. By contrast, however, most of the negative literature on anterior placentation is low-lying or previa cases. In these cases, anterior placement obviously exposes the transfusion, haemorrhage, accreta, and hysterectomy to a greater risk. As our results were limited to normally-sited anterior placentas at term, our figures are more consistent with the larger meta-analytic result that non-low-lying placental location produces only moderate effects on intrapartum and postpartum outcomes.[21-25]

The strengths of the study are that the group is a homogenous cohort where the position of the anterior placenta is ultrasound-verified at term and that major confounders such as multiple gestation, breech birth, and placenta previa are eliminated as they are all key factors in the management of labour and mode of delivery. The limited size and the retrospective single- centre design, however, restrict the generalizability and the ability to identify small effects that are reported in other large population-based studies. Causal damage to the placental site can therefore not be inferred due to the lack of a comparison group with posterior or fundal placental sites. Also, postpartum haemorrhage and neonatal morbidity were not evaluated, as these data were significant in the literature on anterior placenta. Multicentre, prospective studies in the future, directly comparing anteriority, posteriority, and fundal placental location during low-risk term pregnancies, stratified by BMI, parity, and indication of induction, and directly examining intrapartum, postpartum, and neonatal outcomes.

CONCLUSION

It is concluded that anterior placental location is associated with a lower need for induction of labour, as only a small proportion of patients required intervention. The majority of women with anterior placentas went into labor on their own at term, and induction was strongly linked to higher rates of cesarean delivery and lower parity. The need for induction was not substantially impacted by the mother's age or pre-pregnancy BMI. These results imply that most women can achieve term spontaneous labor without complications and that an anterior placenta generally does not increase obstetric intervention.

Ethical approval:

Ethical approval was taken from institutional review board of Lahore Medical & Dental College, with the IRB number LMDC-L-ORIC-48-2026 Dated 26-01-2026.

Conflict of Interest:

Authors declare no conflict of interest.

Financial Disclosure:

None

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Authors' Contributions:

AP & SAB: Conceptualization & study design.

KI, NI: Data Collection and manuscript drafting.

SI, KI, II: Data Analysis and critical review.

NI, AP, SI, II: Supervision &Manuscript drafting & proof reading.

All authors have read and approved the final version of the manuscript and are responsible and accountable for the accuracy and integrity of the work.

1. Alisha Pasha
Senior Registrar of Obstetrics & Gynecology,
Ghurki Trust Teaching Hospital, Lahore
2. Shamsa Arshad Butt
Post Graduate Resident Gynaecology & Obstetrics,
Ghurki Trust Teaching Hospital, Lahore
3. Kiran Iqbal
Associate Professor of Obstetrics & Gynecology,
Ghurki Trust Teaching Hospital, Lahore
4. Nabiha Iqbal
Assistant Professor of Obstetrics & Gynecology,
Ghurki Trust Teaching Hospital, Lahore
5. Sadia Ilyas
Assistant Professor of Obstetrics & Gynecology,
Ghurki Trust Teaching Hospital, Lahore
6. Iram Iqbal
Professor of Pathology
The Children's Hospital and University of Child Health Sciences,
Lahore