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PLACENTA PRAEVIA: CORRELATION OF TVS FINDINGS AND MODE OF DELIVERY

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ABSTRACT

Objective was to study the maternal outcome in cases of placenta previa and correlating it with Tran's vaginal sonography (TVS) finding. *Design:* Cohort study. *Setting:* RMC, JLN Hospital Ajmer. *Methods:* Prospective study of 150 cases of placenta praevia, who attended the antenatal opd, diagnosed by transvaginal ultrasound, between 2009 to 2011. The cases were followed till term and findings were recorded with respect to mode of delivery, APH, PPH. Statistical analysis was performed using the graph pad software, Chi square test, Fisher's exact test were used where appropriate. *Main Outcome Measures:* Likelihood of vaginal delivery and major obstetric haemorrhage. *Results:* A total of 150 pregnancies were studied. In the 64 women who laboured, the likelihood of vaginal delivery rose significantly as the placental edge to internal os distance increased. Caesarean section rate was 96% when the placental edge-internal os distance was 0.1 to 2.0 cm, falling to 52% when this measurement was over 2.0cm ($P < 0.0001$). Also significant increased frequency of APH ($p=0.013$), and preterm delivery (<37 wks, $p=0.004$) with increasing grades of pl.praevia. *Conclusion:* Trial of vaginal delivery is appropriate in cases with a placental to internal os distance >2 cm. The term 'praevia' should be restricted to cases where the placental edge is ≤ 2 cm from the internal os, as the likelihood of operative delivery and significant antepartum haemorrhage is high. Cases where the placenta is more than 2 cm from the internal os, have a greater than 50% chance of vaginal delivery and should be defined as 'low lying' in order to reduce the clinician's bias towards operative delivery.

Key Words: *Placenta Previa, APH, PPH*

INTRODUCTION

Placenta Praevia

Placenta praevia is an obstetric complication in which the placenta is inserted partially or wholly in lower uterine segment (Abramowicz and Schiener (2007)). It can sometimes occur in the later part of the first trimester, but usually during the second or third. It is a leading cause of antepartum haemorrhage (vaginal bleeding). It affects approximately 0.4-0.5% of all labours (Bhide and Thilaganathan (2004)).

Traditionally four types of placenta praevia recognised (Bhide and Thilaganathan, 2004; Oyelese and Smulian, 2006; Timor-Tritsch and MONteagudo, 1993).

1. Total placenta praevia: internal cervical os is completely covered with placenta.
2. Partial placenta praevia: internal cervical os partially covered with placenta praevia.
3. Marginal placenta praevia: edge of placenta does not cover but lie in close proximity to the internal cervical os.
4. Low lying placenta: edge is not near os, but can be palpated by examining finger introduced through the os, generally 2 cms from os (Williams, 1997).

Placenta praevia currently can be classified on the basis of USG findings as (Bhide *et al.*, 2003):-

Group 1: Placental edge reached or overlapping internal os.

Group 2: Placental edge was from 0.1 to 2cms from internal os.

Group 3: Placental edge was more than 2cms from internal os.

Incidence: The overall incidence is 1/200 births and 1/1,000 are grading IV with placenta over the entire cervix (Neilson, 2003; Miller *et al.*, 1997).

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In United States, Placenta praevia occurs in 0.3-0.5% of all pregnancies. The risks increase 1.5- to 5-fold with a history of cesarean delivery. Of all placenta praevias, the frequency of complete placenta praevia ranges from 20-45%, partial placenta praevia accounts for approximately 30%, and marginal placenta praevia accounts for the remaining 25-50% (Marshall *et al.*, 2011).

According to US Census Bureau, Population Estimates (2004), the incidence of pp in US is 0.01%.

In India, according to Singh *et al.*, the incidence of placenta praevia in cases with previous cesarean section (C.S.) was found to be 3.9 per cent as compared to an overall incidence of 1.9 per cent ($p < 0.01$).

The incidence of placenta praevia diagnosed during 2nd trimester trans abdominal sonography (TAS) is commonly reported as 5%, and the incidence of placenta praevia at delivery as, 0.5% only. Only 10% placenta praevia diagnosed during 2nd trimester persist to delivery. Several studies have attributed this low incidence of pp at term to the errors in scanning techniques, such as bladder over distention and maternal myometrial contractions. Differential growth of uterine fundus with subsequent dragging of placenta from the internal os (placental migration) is also proposed to contribute to this low persistence rate of 2nd trimester placenta praevia (Taipale *et al.*, 1998; Becker *et al.*, 2011).

Diagnosis

Ultrasound is the ideal tool to determine the location of placenta praevia. In fact this was the one of the first uses of US published in literature (Campbell and Kohorn, 1968; Donald and Abdullah, 1968).

Both TAS and TVS are safe techniques with minimal or no risk to mother and fetus. However in modern obstetrics practice, diagnosis is mainly by TVS which is superior to abdominal approach (Townsend *et al.*, 1986). With TAS, there is poor visualisation of the posterior placenta (Townsend *et al.*, 1986) fetal head can interfere with the visualization of lower segment (King, 1987) and obesity (Timor-Tritsch *et al.*, 1987) and underfilling of urinary bladder or over filling (Townsend *et al.*, 1986; Lauria *et al.*, 1996) can interfere with accuracy. For these reasons, TAS is associated with false positive rate for diagnosis of placenta praevia of up to 25%. Specificity 98.8%, positive predictive value 93.3%, negative predictive value of 97.6%, established TVS as the gold standard for the diagnosis of placenta praevia (McClure and Dorman, 1990; Sherman *et al.*, 1992). TVS has also shown to be safe in the presence of established vaginal bleeding in placenta praevia cases (McClure and Dorman, 1990; Sherman *et al.*, 1992; Leertentveld *et al.*, 1996).

Placenta praevia represents a time obstetrics emergency and is significantly associated with maternal mortality and morbidity. Antepartum haemorrhage complicates 2-5% of pregnancies of which approximately one-third are due to placenta praevia. Placenta praevia is significant contributor to PPH.

Perinatal mortality rate associated with PP ranges from 2-3%. Fifty percents of PP have preterm delivery. Neonates are more likely to have low birth wts, RDS, jaundice, NICU admissions and longer hospital stay.

MATERIALS AND METHODS

This is a prospective analysis of all cases of placenta praevia booked for routine antenatal care and delivery at RMC, JLN MEDICAL COL, AJMER from Oct 2009 to Sept 2011. All cases were diagnosed by transvaginal ultrasound, which was performed for a number of reasons including: identification of a low lying at the time of the routine 21-22 week anomaly scan, antepartum haemorrhage. The patients were managed according to the departmental protocol. All cases where the placenta was low lying on the anomaly scan were booked to have placental localisation from 32 weeks onwards, and followed till delivery. We only included in the analysis cases where the lower edge of the placenta was 3.5 cm or less from the internal cervical os. Only the most recent scan prior to delivery was included into the analysis. The hospital policy was to admit all cases of placenta praevia presenting with antepartum haemorrhage. Women are allowed to go home if they do not have fresh bleeding for a period of over one week after the admission. However, re-admission with a repeat bleeding episode was an indication for admission till delivery. Elective caesarean section for placenta praevia was scheduled for 38-39 weeks. An emergency caesarean section was performed if women with major praevia went into preterm labour or developed

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significant vaginal bleeding. The mode of delivery in cases of minor placenta praevia cases was decided on clinical grounds. Delivery was defined as elective caesarean section if surgery was performed at a planned date on an elective operative list. All other caesarean sections were classified as emergency ones. The latter were divided into those performed for presumed bleeding from the placenta praevia or for other obstetric reasons. Postpartum haemorrhage was defined as an estimated blood loss >500 mL in women delivered vaginally. Because the average blood loss at a caesarean section is about 1000 mL, a loss >1000 mL was considered a postpartum haemorrhage in women undergoing a caesarean section. Fetal outcome in terms of apgar score at 1 and 5 mins, and fetal wts were noted.

Statistical analysis was performed using the software Graph pad; chi square test and Fisher's exact test were used where appropriate.

Table 1: Demographic characteristics of the 121 women with placenta praevia

	Gp.1(overlapping or reaching os)	Gp.2(0.1-0.2cms)	Gp.3(2.1-3.5cms)
No.of cases	52	50	48
Age(yrs)	19-42	20-45	21-42
Gestational age at last scan(wks)	(33-38)36	(32-39)36	(33-40)36

Cases are grouped according to the distance between placental edge and internal cervical os. All the values are expressed as median (range).

RESULTS AND DISCUSSION

Results

The entry criteria were fulfilled in 150 pregnancies. The cases were divided into three groups for analysis. Group 1 consisted of women where the placenta edge reached or overlapped the internal os. Group 2 included those women where the placental edge was from 0.1 to 2.0cm from the internal os, while Group 3 included women where the placental edge was more than 2.0 cm from the internal os. The demographic characteristics of the three groups were similar (Table 1) during the study period.

Table 2: Prevalence of antepartum haemorrhage and postpartum haemorrhage

Placental edge to internal OS distance	No. of pregnancies	No. with APH(%)	No. with PPH(%)
Overlapping or reaching os (gp 1)	52	29(55)	6(11.9)
0.1-2cms(gp.2)	50	23(46)	2(5)
2-3.5cms(gp.3)	48	13(27)	3(7.7)
Total	150	65(43)	10((6.6)

The higher rates of antepartum haemorrhage with increasing degree of placenta were statistically significant ($X^2=8.58$, $P = 0.0137$)

Table 2 shows the prevalence of antepartum and postpartum haemorrhage in the three groups. The trend for a higher rate of antepartum haemorrhage with increasing degree of placenta praevia was statistically significant, ($X^2= 8.58$, $P < 0.005$).

Table 3 shows statistically significant increasing trend of preterm delivery with increasing grades of placenta praevia i.e. more preterm deliveries as placental edge approaches the internal os. Table 3 illustrates the rates of caesarean section and vaginal delivery in the three groups.

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Table 3: Relation of gestational age at the time of delivery with increasing severity of placenta praevia

Groups	no.of cases	Delivery at<34wks(n)	Delivery at<37wks(n)
1(overlapping or reaching upto os)	52	1	17
2(0.1-2cms)	50	0	11
3(2-3.5cms)	48	1	3

Statistically significant increasing chances of preterm delivery at, 37wks of gest. age with increasing grades of placenta praevia($X^2=10.73, P=0.0004$).

Table 4: Likelihood of undergoing a caesarean section for any reason with an ultrasound diagnosis of placenta praevia

Placental edge to internal os distance(Group)	No.of cases	Elective Cs	Emergency Cs for p/v	Emergency Cs for other reasons	Vaginal deliveries	%of vaginal deliveries
Overlapping or reaching os(1)	52	31	12	8	0	0
0.1-2cms(2)	50	25	7	15	2	4
2.1-3.5cms(3)	48	13	2	10	21	43

(Fisher's exact test: Group 1 vs 2, $P = 0.4704$; Group 2 vs 3, $P = 0.0001$; Group 1 vs 3, $P = 0.0001$). The likelihood of vaginal delivery in labouring women based on the distance between placental edge and the internal cervical os is also shown. The difference in the proportion of women delivering vaginally between Group 1 vs Group 3 is statistically significant with $P=0.0001$ (Fisher's exact test), between Group 2 and Group 3 is also statistically significant (Fisher's exact test, $P < 0.0005$).

Discussion

This is one of the studies of women with placenta praevia diagnosed using transvaginal ultrasound in the late third trimester of pregnancy. The two previous studies to examine ultrasound findings in late pregnancy included fewer women and had a larger time interval between ultrasound and delivery (Oppenheimer *et al.*, 1991; Dawson *et al.*, 1996; Oppenheimer *et al.*, 1991) performed a retrospective analysis of 52 cases of placenta praevia where ultrasound examinations were performed, on average, five weeks prior to delivery. Dawson *et al.*, (1996) used translabial ultrasound in 40 women with suspected placenta praevia with an average interval of six weeks between ultrasound and delivery. In the latter study, apart from the use of translabial rather than transvaginal ultrasound, only 31 women had a placenta that was less than 3.0 cm from the internal os at 32 weeks of gestation. The time interval between ultrasound and delivery has a significant influence on the classification and clinical outcome of placenta praevia. Several studies have demonstrated that the distance between the placental edge and the internal cervical os changes with advancing gestation (Ruparelia and Chapman, 1986; Andersen and Steinke 1988; Mustafa *et al.*, 2002; Chapman *et al.*, 1979; Gallagher *et al.*, 1987; Dashe *et al.*, 2002; Oppenheimer *et al.*, 2001). Indeed, in one study, the mean rate of placental migration was estimated at 0.54 cm per week in the third trimester of pregnancy (Oppenheimer *et al.*, 2001). Thus, in the current study with an average of two weeks from ultrasound to delivery, the placenta is unlikely to have migrated more than 1.0 cm. In contrast, the placenta is likely to have migrated, on average, 2.7 and 3.2 cm in the two previous studies where the ultrasound to delivery interval was five and six weeks, respectively. The upper limit of the placental edge to internal os distance for the use of the term 'praevia' is unclear and undefined. Oppenheimer *et al.*, 1991) included cases where this distance was up to 5.8 cm. Dawson *et al.*, 1996) arbitrarily chose an upper limit of 3.0 cm. In the present study, an upper limit of 3.5 cm was used,

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as none of the cases of antepartum haemorrhage with a placental edge to internal os distance of over 3.5 cm were suspected to be due to placenta praevia. We acknowledge that this definition is arbitrary and based on clinical interpretation of ultrasound findings. However, analysis of the current data set allows the establishment of guidelines for delivery. Given the paucity of published evidence, the Royal College of Obstetricians and Gynaecologists (2001) recommend that trial of vaginal delivery is appropriate if the placental edge–internal os distance is over 2.0 cm. This guideline formed the basis for our post hoc definition of placenta praevia groups. The Royal College of Obstetricians and Gynaecologists' recommendation is based on the findings of Oppenheimer *et al.*, (1991), who performed a retrospective analysis of placenta praevia, where the data were grouped according to mode of delivery rather than antenatal ultrasound findings. They reported a mean placental edge to internal os distance measured five weeks prior to delivery of 1.1 cm (range 0 to 2.0 cm) in cases requiring a caesarean section ($n = 7$), as opposed to 3.1 cm (range 1.8–5.8 cm) in those delivering vaginally ($n = 14$). The findings of the latter study are of limited clinical value because the grouping based on mode of delivery does not provide useful information for clinicians who need to make decisions based on antenatal ultrasound findings. The probability of vaginal delivery at a given placental edge–internal os distance cannot be calculated from the latter study. Indeed, the authors themselves concluded that, given the small numbers, the clinical significance of their findings was to be interpreted with caution and further studies were needed to establish guidelines.

In the present study, the cohorts for comparison were identified on the basis of antenatal ultrasound findings. The findings of this study are that the likelihood for successful vaginal delivery increases with the distance of the placental edge from the internal os. This is clearly demonstrated in Table 4. Even though the emergency caesarean section rate was 94% in Group 2 and 52% in Group 3, these figures are likely to be influenced by clinical bias. When evaluating the likelihood of vaginal delivery, it is clear from the data that placenta praevia reaching or overlapping the internal cervical os requires elective caesarean delivery. It is equally evident that when the placental edge is greater than 2 cm from the internal os, the likelihood of a successful trial of vaginal delivery is good. In Group 2, where the placental edge to internal os distance was 0.1 to 2cm, some women achieved a successful vaginal delivery. However, all women with a placental edge to internal os distance of 1 cm or less required a caesarean delivery. Table 4 also demonstrates a trend for decreasing caesarean section rates with increasing placental edge to internal os distances. The data of this study (table 2) demonstrate that the likelihood for antepartum haemorrhage falls significantly from 55% in Group 1 to 27% in Group 3. It is important to note that a significant proportion (44%) of women with a placenta encroaching or overlapping the internal os did not have bleeding in the antenatal period. These data are supported with the two-in-three risk of antepartum haemorrhage reported in older series, where the diagnosis of placenta praevia was made on clinical grounds (Hill and Beischer, 1980). Six out of the 11 cases of postpartum haemorrhage took place in the group with the placenta overlapping the internal os. The postpartum haemorrhage rate in Groups 2 and 3 was similar to the background postpartum haemorrhage rate within our unit.

Here in our study, (table 3) we also found increasing trend of preterm deliveries with increasing grades of placenta praevia, as shown in table 3, the no. was 17 (32.6%) in comparison to group 3, where the no. of pregnancy with delivery at <37wks were 3(6.25%). Similar results were published by Tuzovik (2006), 45.5% cases delivered preterm in complete placenta praevia gp, while in incomplete placenta praevia, the rate was 39%. Dola *et al.*, also found that women with complete placenta praevia tended to deliver at an earlier gestational age.

Conclusion

The data of this study support the trial of vaginal delivery in cases with a placental to internal os distance >2 cm and an elective caesarean section when this distance is 1 cm or less. We propose that the term 'praevia' should be restricted to cases where the placental edge is 2 cm or less from the internal os, as the likelihood of operative delivery and significant postpartum haemorrhage remains high. Cases where the placenta is more than 2 cm from the internal os have a high chance of vaginal delivery and should be

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defined as ‘low lying’ rather than praevia, in order to reduce the bias towards operative delivery in these women

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