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Unexplained Breech presentation due to cornual location of placenta in singleton pregnancies at Ayub Teaching Hospital, Abbottabad

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ABSTRACT

Introduction: Breech presentation of the fetus is a significant risk factor for maternal and perinatal morbidity and mortality. Its well-known causes are Polyhydramnios, Oligohydramnios, Hydrocephalus, Uterine anomalies, Pelvic tumors, Placenta Previa, and placental location, particularly Cornual Location.

Objective: The present study was undertaken to evaluate Cornual Location of placenta as a risk factor for breech presentation at Ayub Teaching Hospital, Abbottabad.

Materials & Methods: A case control study was conducted at Department of Obstetrics and Gynecology Unit A of Ayub Medical College Abbottabad from May 01, 2016 to April 30, 2017 on 100 cases of singleton pregnancies from 28 weeks onwards (booked and non-booked), divided into 50 cases of cephalic presentation (controls) and 50 cases of breech presentation (cases) matched for age and parity. Convenience sampling was done for both groups. In all subjects a relevant obstetric history was taken, clinical and obstetric examinations performed and ultrasound localization of the placenta done. Data were recorded on pre designed Performa; the main outcome measure was the frequency of Cornual Location in cephalic and breech pregnancies. Data were analyzed by SPSS 10.0 for descriptive statistics. Correlation was performed as indicated. The Chi Square and Student's T Tests were used as indicated for qualitative and quantitative variables, respectively. A $p \leq 0.05$ was considered significant. The Odds Ratio (O.R.) was calculated using 2 x 2 tables.

Results: In 37(74%) patients with breech presentation the placenta was located in the Cornual end of the uterus as compared to 17(34%) in the cephalic presentation group; placental location was fundal in 13(26%) patients in cases group compared to 33(66%) in the controls. These differences were statistically significant with $p<0.001$. The Odds Ratio for Cornual Location as a risk factor for breech presentation was calculated as 5.5.

Conclusion: Though Cornual Location is a benign condition, it is a risk factor for breech presentation in singleton pregnancies.

Keywords: Placenta; Uterus; Labor Presentation; Breech Presentation; Parity.

The author declared no conflict of interest and agreed to be accountable for all aspects of the work.

INTRODUCTION

Breech presentation, which occurs in approximately 3% of fetuses at term, describes the fetus whose presenting part is the buttocks and/or feet. Although most breech fetuses are normal, this presentation is associated with an increased risk for congenital malformations and mild deformations, torticollis, and developmental dysplasia of the hip.[1] Women with fetuses in breech presentation at or near term are usually offered external cephalic version. Most fetuses with persistent breech presentation are delivered by cesarean delivery, which is associated with a clinically significant decrease in perinatal/neonatal mortality and neonatal morbidity compared with vaginal delivery.[2] The main types of breech presentation are:

Frank breech: In the frank breech position, both hips are flexed and both knees are extended so that the feet are adjacent to the fetal head. At term, 50-70% of breech fetuses are in this position.[1,3]

Complete breech: In the complete breech position, both hips and both knees are flexed. At term, 5-10% of breech fetuses are in this position.[1]

When the fetus presents as a breech, the thighs may be flexed & the legs extended over the anterior surface of the body (frank breech presentation). Breech presentation is defined as a fetus in a longitudinal lie with the buttocks or feet closest to the cervix. This occurs in 3-4% of all deliveries. According to Sheer and Nubar,[4] the percentage of breech deliveries decreases with advancing gestational age from 22-25% of births prior to 28 weeks' gestation to 7-15% of births at 32 weeks' gestation to 3-4% of births at term.

Predisposing factors for breech presentation include prematurity, uterine malformations or fibroids, polyhydramnios, placenta previa, fetal abnormalities (e.g., CNS malformations, neck masses, aneuploidy), and multiple gestations. Fetal abnormalities are observed in 17% of preterm breech deliveries and in 9% of term breech deliveries.[4]

Perinatal mortality is increased 2- to 4-fold with breech presentation, regardless of the mode of delivery. Deaths are most often associated with malformations, prematurity, and intrauterine fetal demise.

There are three types of breech presentation: complete, incomplete, and frank. Complete breech is when both of the baby's knees are bent and his feet and bottom are closest to the birth canal. Incomplete breech is when one of the baby's knees is bent and his foot and bottom are closest to the birth canal. Frank breech is when the baby's legs are folded flat up against his head and his bottom is closest to the birth canal.[5] There is also footling breech where one or both feet are presenting. Fetal anomaly, prematurity and umbilical cord prolapse as well as birth trauma account for higher morbidity and mortality rates for mother and fetus regardless of gestational age or mode of delivery.[6]

Using ultrasonography Hirano K[5] investigated the influence of placental location on fetal position, duration of gestation, duration of labor etc., on 321 patients in the 3rd trimester. Along with this change of placental volume with the uterine contraction was also studied and results obtained showed that as for the placental location, it was found at the posterior uterine walls in 139, on the anterior in 97, right lateral 55 and on the left lateral in 302. When the placenta was located at uterine cornu, more fetuses were with breech presentation, and when it was found on lateral side the fetuses were with the position facing the placenta[6]. In multipara, the gestational duration was longer when the placenta was located on the right side of uterus than on the left or anterior side ($p<0.05$). Placental location site had no relation with labor duration, fetal weight, placental weight, amount of hemorrhage during labor and cord cutting. During uterine contraction, the placental volume did not change when pressure was 30 mm Hg. During contraction, when the pressure was 50 mm Hg, the placental volume became less than 30 cm than during interval. During interval, intra-placental blood volume was 177cm.[7]

Location of placenta is a benign condition but is also strongly associated with breech presentation. The buttocks and feet of the fetus do not provide an effective wedge to block and dilate the cervix. The umbilical cord may prolapse and/or the head may get trapped during delivery. To investigate the association of cornual-fundal location of the placenta and breech presentation at term delivery study was conducted by Slobodan Sekulić.[8]

This study was conducted at the Department of Obstetrics and Gynecology, Novi Sad, in 2011. The inclusion criteria were delivery at ≥37 weeks of gestation, singleton gestation, and cornual-fundal location of the placenta determined by ultrasonography at ≥37 weeks of gestation when 3/4 or more of the placenta was in the cornual-fundal region.[8] Out of 2750 ultrasound examinations performed, 143 showed cornual-fundal location of the placenta (frequency 5.2%). Eighty-six (60.14%) cases had cephalic presentation and 57 (39.86%) had breech presentation. Of the remaining cases with non- cornual-fundal location, 2585 had cephalic presentation and 22 (0.84%) had breech presentation. The difference in the frequency of breech presentation between the cornual-fundal and non-cornual-fundal groups was significant ($\chi(2)=77.78$, $p<0.001$).[8] Cornual-fundal location of the placenta may be an important clue in resolving the etiology of a number of cases of breech presentation at term delivery.[9] Fiano and Vaclavinkova in 1978 provided sonographic evidence of a much higher prevalence of placental location in the cornual fundal region for breech presentation (73%) than for vertex presentation (5%). In the year 2000 Filipov E et al [10] in their prospective study selected two groups of pregnant women, the first with cephalic presentation (n=125) and second with breech presentation (n=124). All of the pregnant women examined were nulliparous with term pregnancy (37-40 weeks). Uterine and fetal abnormalities were excluded. The cornual-fundal localization of the placenta was found in 4.8% in the pregnant women with cephalic presentation and 62.6% in pregnant women with breech presentation.

Risk factors for breech presentation include the following.[10]

Gestational age of fetus less than term. Prior to the onset of labor, the fetus turns into cephalic presentation. If labor occurs abruptly or unexpectedly (e.g. following trauma), then the fetus may not have the chance to shift position.
Increased maternal parity may cause stretch or laxity of the uterus, predisposing the patient to breech deliveries.
Multiple fetuses: as a result of limited space in the uterus, fetus in cases of multiple birth may position themselves head to foot.
Polyhydramnios or too much amniotic fluid may allow the fetus too much movement
Oligohydramnios or too little amniotic fluid, may impede final shift of the fetus to cephalic presentation.
Placenta previa or placental location over the cervical os allows the fetus too much space for movement within uterus.
Hydrocephalus or enlarged head in the fetus, makes it more difficult for the fetus to make final shift to cephalic presentation prior to the onset of labor.
Previous breech deliveries may increase the likelihood of breech presentation, as the uterus may have anomaly predisposing it to breech presentation.
Uterine anomalies that predispose to breech presentation include bicornuate uterus and septate uterus.
Pelvic tumors may impede fetal movement and trap the fetus in breech presentation position.
Placental cornual-fundal location also increases the risk of breech presentation. The authors conclude on the basis of the data in the study that the localization of the placenta influences the fetal position in the uterus.

In 1987 Haruyama Y,[11] conducted an ultrasonographic study of 5294 single pregnancies between 16 and 41 weeks gestation with 47 breech presentations at term. It revealed the following:

In 60.9 to 74.0% placenta was found in the mid- anterior or mid posterior region of the uterus. In 12.8 to 18.7% of cases the placenta was located in the fundal region before 28 weeks but thereafter it was found in the cornual region. In 13.8 to 19.1% of 47 cases with breech presentation at term, placenta was located in the cornual region in 28, in the fundus in 7, in the lateral uterine wall in 6 and in the mid anterior or mid posterior wall in another 6. In 38% with breech presentation in gestational age from 16 to 19 weeks, placenta was located in the cornual region in 50%. When it was located in the lateral regions, 52.8% were in the fundus and 47.2% in the middle with no significant difference in the incidence of occurrence. However, in gestational weeks from 36 to 41 the incidence was 20.2, 6.4, 9.0 and 1.1% respectively and spontaneous version rate was significantly higher when the placenta was located in the middle region than in others ($p<0.01$). The author has concluded that breech presentation in the singleton pregnancy is caused by placental position; when the placenta markedly indents and changes the inverted pear shape of

the amniotic cavity, the spontaneous fetal cephalic version is inhibited.

Although there is an increased perinatal mortality in the fetuses presenting by breech, it has proved impossible to separate out the independent risk of the breech position itself. The perinatal mortality remains increased even when delivery is by cesarean section. Breech infants scored less favorably neurologically regardless of the mode of delivery; this reflects the role of breech presentation rather than birth injury.[12]

The risks to the mother are easier to quantify. Breech presentation confers an increased likelihood of cesarean section with its attendant morbidity and mortality. The rate of cesarean section for breech presentation has risen over recent years.[13] Breech presentation is a high risk pregnancy so placental localization after excluding other risk factors for breech is an important risk factor to be studied because it has a determining effect upon presentation of the fetus. Although a few studies have been done in Pakistan on breech presentation, no study has been performed in our setting on cornual location of placenta having a determining effect upon presentation of fetus. The present study is meant to provide vital information in this regard. The present study was undertaken to evaluate cornual location of placenta as a possible risk factor for breech presentation at Ayub Teaching Hospital Abbottabad, Khyber Pakhtunkhwa, Pakistan.

MATERIALS & METHODS

This was a case control study conducted at department of Obstetrics & Gynecology "Unit A" of Ayub Teaching Hospital (ATH), Abbottabad, over a period of one year (May 01, 2016 to April 30, 2017). ATH is a 1000-bedded tertiary care hospital with a wide catchment area. Booked and Unbooked cases are seen in outpatient department and up to 3000 women are delivered per year. The facility of ultrasonography is available in the labor room. Subjects included 100 cases of singleton pregnancies from 28 weeks onwards (booked & unbooked) that came through out patient department and casualty, divided into 50 cases of Cephalic presentation (controls) and 50 cases of Breech presentation (cases). In all subjects, relevant obstetrics history was taken, clinical and obstetric examinations performed, and ultrasound localization of placenta done. All cases with twin and multiple gestation, uterine abnormalities such as unicornuate uterus, short umbilical cords, uterine tumors and congenital anomalies, grand multipara, oligohydramnios and other placental anomalies e.g. placenta previa, were excluded. Among controls, all cases of singleton cephalic presentations with any type of complication of pregnancy were excluded. All patients with breech presentation confirmed by ultrasonography were admitted if at term, otherwise they were called for regular antenatal checkups through outpatient department. Parameters examined included gestational age, parity and socioeconomic status of patients. Control subjects with normal singleton cephalic presentation matched for age and parity were also subjected to ultrasonography either in the ultrasound department or in the labor room to localize the placental site.

Data were collected on predesigned Performa containing relevant variables and entered into SPSS 10.0 for analysis. Data were analyzed for frequencies, percentages, means and S.D. Correlation analysis was also performed between relevant variables. Appropriate grouping of subjects and controls were done where needed. Tests of significance were performed as indicated for various variables. The Chi Square test was used for nominal (qualitative) data, whereas the Student's t-test was used for numerical (quantitative) data. A p value of ≤ 0.05 was considered significant.

The Odds ratio (O.R.) was calculated using a 2 x 2 table and applying the formula: O.R. = A x D / B x C

RESULTS

A total of 100 subjects were included in the study comprising of 50 cases of cephalic presentation and 50 cases of breech presentation. Basic obstetric data of all 100 subjects is shown in Table 1.

Regarding the age distribution of subjects, 19 (19%) were in the age group of 15-25 years, 66 were in the age group of 26-35 years and 15were in the age group of 36-45 years. The socio economic status was poor in 51 subjects and satisfactory in 49 subjects. The parity distribution showed 35 subjects to be primigravida and 65 to be multigravida. Placenta was located in the fundal position in 46 subjects and in the cornual position in 54 subjects.

Table 1: Obstetric data of all subjects (n = 100).

Variables	f = %	Mean ± S.D.
Age Groups (Years)		
15 – 25	19	30.61 ± 4.92
26 – 35	66	
36 - 45	15	
Socio Economic status		
Poor	51	-
Satisfactory	49	
Parity		
Primigravida	35	-
Multigravida	65	
Placental localization		
Fundal	46	-
Cornual	54	

Data regarding the two presentation groups is presented in Table 2.

The age distribution of subjects with cephalic presentation showed 12(24%) cases in the 15-25 years age group, 32(64%) cases in the 26-35 years age group and 6(12%) cases in the 36-45 years age group; corresponding distribution for subjects with breech presentation were 07(14%), 34(68%) and 09(18%). The socio-economic status in subjects with cephalic presentation was poor in 25(50%) of cases and satisfactory in 25(50%) cases; corresponding figures for the subjects with breech presentation were 34(68%) and 16(32%). Parity distribution for subjects with cephalic presentation showed 20(40%) to be primigravida and 30(60%) to be multigravida; the subjects with breech presentation showed corresponding figures of 15(30%) and 35(70%). For the subjects with cephalic presentation, the placenta was fundal in 33(66%) of cases and cornual in 17(34%) cases; the corresponding figures for the subjects with breech presentation were 13(26%) and 37(74%). This difference was highly significant with $p < 0.001$.

Table 2: Obstetric data by presentation groups (n = 50 each).

Variables	Presentation	
	Cephalic f (%)	**Breech** f (%)
Age Groups (Years)		
15 – 25	12 (24)	07 (14)
26 – 35	32 (64)	34 (68)
36 – 45	06 (12)	09 (18)
Mean ± S.D.	30.12 ± 4.96	31.10 ± 4.87
Socio economic status		
Poor	25 (50)	34 (68)
Satisfactory	25 (50)	16 (32)
Parity		
Primigravida	20 (40)	15 (30)
Multigravida	30 (60)	35 (70)
Placental localization		
Fundal	33 (66)	13 (26)
Cornual	17 (34)	37* (74)

*p<0.001 compared to the frequency of cornual location in cephalic presentation.

The Odds ratio was calculated as follows:

Table 3: Calculation of the Odds Ratio

		Breech Presentation		Total
		Yes	No	
Cornual Location	Yes	37 (A)	17 (B)	54
	No	13 (C)	33 (D)	46
Total		50	50	100

O.R. = A x D / B x C = 1221 / 221 = 5.5.

Interpretation: Pregnancies with breech presentation are 5.5 times more likely to have a cornual location of placenta as compared to pregnancies with cephalic presentation.

DISCUSSION

Breech presentation occurs when spontaneous version to cephalic position is prevented as term approaches or if labor and delivery occur prematurely before cephalic version has taken place. Some causes include oligohydramnios, hydramnios, uterine anomalies such as bicornuate or septate uterus, pelvic tumors obstructing the birth canal, abnormal plantation, advanced multiparity and contracted maternal pelvis.[14] The incidence of breech presentation varies with the gestational age, being approximately 14% at 29-32 weeks and 2.2-3.7% at term (depending on the use of external cephalic version), giving an overall figure of 3-4%.[15]

The preterm onset of labor (probably the chance lie of a highly mobile fetus in relatively copious liquor) is the major reason for breech presentation. Cornual location of the placenta is also strongly associated with breech presentation only 5% of vertex presenting fetuses have a cornual placenta in comparison to 73% of those presenting by the breech.[16]

In the present study 74% of breech presentation had a cornual location of placenta (Table 2); there was also a significant correlation between the placental localization and presentation of fetus (Figure 16).

Location of placenta is a benign condition but is also strongly associated with breech presentation.[17]

The study by Filipov E et al [10] showed cornual-fundal localization of the placenta in 4.8% in the pregnant women with cephalic presentation and 62.6% in pregnant women with breech presentation. The authors conclude on the basis of the data in the study that the localization of the placenta influences the fetal position in the uterus. In the present study 34% of pregnant women with cephalic presentation had cornual localization of placenta, while 74% of subjects with breech presentation had cornual location of placenta.

The ultrasonographic study of 5294 single pregnancies between 16 and 41 weeks gestation with 47 breech presentations at term conducted by Haruyama Y [11]revealed that in 60.9 to 74.0% cases, placenta was found in the mid- anterior or mid posterior region of the uterus. In 12.8 to 18.7 % of cases the placenta was located in the fundal region before 28 weeks but thereafter it was found in the cornual region in 13.8 to 19.1% of 47 cases; with breech presentation at term, placenta was located in the cornual region in 28, in the fundus in 7, in the lateral uterine wall in 6 and in the mid anterior or mid posterior walls in another 6. In 38% with breech presentation in gestational age from 16 to 19 weeks placenta was located in the cornual region in 50% when it was located in the lateral region, 52.8% in the fundus and 47.2% in the middle with no significant difference in the incidence of occurrence. However, in gestational weeks from 36 to 41 the incidence was 20.2, 6.4, 9.0 and 1.1 % respectively and spontaneous version rate was significantly higher when the placenta was located in the incidence region than in others ($p < 0.01$). The author has concluded that the breech presentation in the single pregnancy is caused by placental position; when it markedly indents and changes the inverted pear shape of the amniotic cavity, the spontaneous fetal cephalic version is inhibited.

In the present study 66% of (single) pregnancies with cephalic presentation had fundal localization of placenta and 26% with breech presentation had fundal attachment of placenta, while 34% of cephalic presentations had cornual localization of placenta and 74% of breech presentation had cornual attachment of placenta which reflects a significant difference ($p < 0.001$). In our study patients were divided in 3 age groups and 14% of patient with breech presentation were of 15-25 years of age. 68% of patients were of 26-35 years of age and 36-45 years of age were 18%.

Luterkot M et al, [7] used ultrasound examination in an attempt to identify fetal and environmental difference between breech and vertex presentation. During a period of 13 months 228 pregnancies with the fetus in breech position were found by routine ultrasound screening in the 33rd gestational weeks. Before delivery, 132 fetuses (58%) turned to vertex presentation and 96 (42%) remained in breech presentation. Fetal growth, posture, position, placental site and amniotic fluid volume in 33rd, 35th and 38th gestational week were studied. In contrast to earlier proposed theories no difference between the two groups (breech and vertex) was found regarding the frequency of extended fetal legs and cornual fundal placental location. However, the neonates born in breech presentation had a shorter gestational age by ten days at delivery and preterm delivery was very common. At birth, the breech neonates weighed 4.9% less than their vertex controls

in relation to gestational age. In the breech groups, there was an increased frequency of oligohydramnios, contracted pelvic and uterine and fetal malformation. This condition occurred only in 15% of the breech pregnancies in the remaining 85% is no single cause of the breech presentation could be identified.

Regarding the effect of socio-economic status on the frequency of cornual location and breech presentation, the present study did not identify any significant differences between the two groups (Table 2) although the number of cases with poor socio-economic status were more in the breech presentation group (25, 50% versus 34, 68%). Other studies have also not commented on any role of socio-economic status having an effect on cornual location or breech presentation.

Parity of subjects, particularly primigravid status has remained a stated risk factor for breech presentation.[16] In the present study however (Table 2) the number of primigravida was not significantly different between the two groups (20, 40% versus 15, 30%). In fact, the number of primigravida was less than the group with cephalic presentation. Multigravidas were also not significantly different between the groups (30, 60% versus 35, 70%) although the number of multigravidas were more in the group with breech presentation.

In the present study pregnancies with breech presentation were 5.5 times more likely to have had a cornual location of placenta as compared to pregnancies with cephalic presentation. This identifies cornual location of the placenta as an independent risk factor for the development of breech presentation. This may be the first study to quantify cornual location as a risk factor for breech presentation.

CONCLUSION

The present study concluded that there was a significantly higher frequency of cornual location in patients with breech presentation (37/50, 74%) as compared to the patients with cephalic presentation (17/50, 34%). This high frequency was an independent variable and was not correlated with any other parameter of study e.g., age groups, socio economic status or parity of patients.

It was found that pregnancies with breech presentation are 5.5 times more likely to have had a cornual location of placenta as compared to pregnancies with cephalic presentation. Cornual localization of placenta is a benign condition, but it is among the causes of breech presentation.

RECOMMENDATION

As breech delivery is associated with significant perinatal morbidity and mortality, so after excluding other risk factors for breech, cornual location of placenta must be ruled out as a cause of breech presentation by the use of ultrasonographic localization of the placenta as early as possible. All cases of cornual location could be successfully localized by ultrasonography in the present study.

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