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Placenta Previa a Lethal Disease: A Correlation With Uterine Scaring

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Abstract

Placenta previa is the main cause of fetomaternal morbidity and mortality globally. Multiparity, advanced maternal age, infertility treatments and recurrent abortions has been linked to the prognosis of placenta previa. Scarred uterus due to history of Cesarean sections is main risk factor as frequently, primary cesarean sections result in recurrent cesareans, which can cause placenta previa. Our study aims to evaluate sonographic association of placenta previa in scarred and unscarred uterus. It was a descriptive cross-sectional study including 84 patients of placenta previa. Data of their previous pregnancies and previous Cesarean sections are also collected. The data is collected from the radiology department of Bhatti International Teaching Hospital Kasur within 3 months. Convenient sampling technique is used in data collection. Among the total 84 cases of females with placenta previa, most of the females had age below 30 years. Previous Cesarean section was mainly associated with the prevalence and grades of placenta previa, while number of previous pregnancies has a non-significant relation to the grades of placenta previa in scarred group of females. Therefore, our study showed that scarring has significant affect on the ultrasonographic grades of placenta previa rather than an unscarred uterus. Our findings indicate that placenta previa grading is significantly greater in the scarred group, indicating a more serious condition than the unscarred group. The result emphasizes the significance of uterine scarring in the development of placenta previa by demonstrating the strong correlation between the severity of the condition and previous Cesarean sections.

Keywords: Placenta Previa, Multiparity.

Impact Statement

We already know the increasing morbidity and mortality due to placenta previa that's why ultrasonographic association of placenta previa with scarred and unscarred uterus and the relation of placenta previa with scarred uterus (due to previous Cesarean section) and unscarred uterus with the help of their ultrasonographic features is necessary. With a focus on the influence of maternal age and parity is essential to improve risk stratification and antenatal surveillance, anticipate

maternal and neonatal complications, guide personalized delivery planning and optimize resource allocation in obstetric care.

Introduction: Placenta is specialized temporary fetal organ developed during pregnancy support the normal development of fetus by supplying nutrients through blood from mother.[1] Placenta previa is the development of the placenta in the lower uterine segment called cervix, covering and blocking the internal os of cervix thus obstructing delivery.[2] The main classification of types of placenta previa is low lying, Marginal (only covers the margins of cervical os), Partial (partially covers the cervical os) and Complete (completely covers the cervical os).[3] Placenta accreta spectrum PAS disorders which include placenta accreta (The placenta attaches directly to the myometrium without invading it), placenta increta (The placenta invades into the myometrium), placenta percreta (The placenta penetrates through the uterine wall and may involve adjacent organs such as the bladder) are more common in women with placenta previa and prior cesarean deliveries[4].

Epidemiological data indicate that the scar left by a Cesarean delivery in the myometrium of the lower uterine segment promotes both blastocyst implantation and aberrant adhesion or invasion of placental villi inside the scar tissue. Women who have had a Cesarean section and have a low-lying placenta or placenta previa are more likely to have PAS disorder. Poor vascularization and tissue oxygenation in Cesarean scars can lead to failure of re-epithelialization and decidualization, affecting implantation, placentation, and fetal growth. Previous Cesarean deliveries have been linked to higher uterine vascular resistance in subsequent pregnancies than vaginal deliveries.

Originally the use of sonography to locate the placenta and detect placenta previa was reported in 1966. [18] Ultrasound is frequently used to diagnose placenta previa. Typically, the placental position is disclosed during the standard anomaly scan. When the placental edge is discovered to be reaching or overlapping the internal cervical opening in the third trimester, a follow-up scan should be planned to confirm this result and arrange the delivery care. Because almost 90% of placentas classified as low in the second trimester shift away from the lower uterine region later in gestation, a definitive diagnosis of placenta previa can only be made in the third trimester of pregnancy.[19] Ultrasound assesses placental thickness and structure. Variations in these parameters can indicate abnormal placental implantation, such as placenta previa. As placenta exhibits a homogeneous, granular echotexture on ultrasound, with evenly distributed echoes.[20] So, in case of placenta previa this homogeneous echotexture extending over the cervical os. Regular echotexture, a uniform lower uterine segment thickness of >4 mm and no disruptions or irregularities in the uterine wall seems in unscarred uterus, whereas in scarred uterus hypoechoic regions at the site of the previous cesarean section scar are seen and hypoechoic or triangular defects were frequently observed in the lower uterine segment which called scar niche or isthmocele. [21-22] Accurate and early detection of placenta previa through ultrasound plays its role in proper management and prevention of mortality and morbidity. [23] The diagnostic accuracy of transabdominal ultrasound in detecting placenta previa has been reported to be 93-97%.[24] But despite the use of transabdominal ultrasound, the false positive rate of diagnosis of placenta previa is 2-6% and the false negative rate is 2%.[25-26]

Recent studies indicate that pregnancies with placenta previa increase the chance of having a small-for-gestational-age (SGA) infant and have a greater prevalence of placental vascular supply abnormalities. Placenta previa with PAS problem increases the risk of antepartum bleeding due

to its position inside the uterine cavity. However, the main risk of significant hemorrhage occurs during delivery, especially in instances that go undetected during pregnancy.[30] There is a considerable chance that persistent placenta previa will complicate the delivery if it is discovered during an ultrasound check after mid pregnancy. After 24 weeks of pregnancy, the risk was close to 50%, and after 32 weeks, it was about 75%. Previa was also at least twice as likely to endure if it was complete as if it were partial.[31]

Our study aims to evaluate the ultrasonographic association of placenta previa with scarred and unscarred uterus and the relation of placenta previa with scarred uterus (due to previous Cesarean section) and unscarred uterus with the help of their ultrasonographic features, it is necessary because of the increasing morbidity and mortality due to placenta previa. With a focus on the influence of maternal age and parity is essential to improve risk stratification and antenatal surveillance, anticipate maternal and neonatal complications, guide personalized delivery planning and optimize resource allocation in obstetric care.

Materials and Methods

It was a cross-sectional analytical study conducted in 3 month as BS research from 16th Jan 2025 to 16th Mar 2025 at Bhatti International Teaching Hospital Kasur, Pakistan. A total of 80 t females were included which had placenta previa. The study was aimed to evaluate the association of placenta previa in scarred uterus and unscarred uterus and relationship of placenta previa and previous pregnancies and previous Cesarean sections. Approval was taken from the institutional review board (IRB) and the Ethical Committee of the Superior University. An Ultrasound unit (Toshiba Xario) with curvilinear transducer frequency ranging from 5-10MHz was used for this study. Patients have been explained the procedure and also aim of the research therefore a written informed consent was signed. AIUM guidelines for fetal ultrasound scanning were followed in the study. The privacy of the patient was given priority while scanning the patient and publication. The complete fetus was evaluated with gray scale sonography and then color Doppler was applied to observe any hemodynamic changes or problems, by accredited Sonographer. Evaluation of placenta previa were taken by sonographer of scarred and unscarred uterus additional variables like patient age, weight and previous scan history, were also noted. Statistical Package for the Social Sciences (SPSS) version 25 (SPSS 24, IBM, Armonk, NY, United States of America) software was used for the evaluation of data(Zaman et al., 2019). The results were summarized in the form of Bar charts and tables. Correlation was evauated while using Pearson correlation between age and scarring of uterus and Paired Sample T-Test was applied to check relation between both groups, all variables were tabulated with their frequencies. Bar charts were drawn against there precentages.

Results

We include 84 cases of females with placenta previa in our study. We divided all the cases into two groups. The first group is scarred group in which females having history of Cesarean sections are included. The total cases of scarred group are 42. While the second group is unscarred group in which females with no history of Cesarean sections are included. 42 cases of unscarred uterus are also included. Our study population included pregnant women aged 28.2 years on average with maximum age 45 years and minimum age 19 years. All the included females have previous pregnancies ranging from 0 to 7 with highest occurrence (23.8%) is noted in 2 previous

pregnancies. The grades of placenta previa diagnosed by ultrasonography included in our study are 4 (I-IV) with highest occurrence (33.3%) of grade 1 placenta previa, while in scarred the highest occurrence (22.6%) is of placenta previa grade III and in unscarred group (31.0%) is of placenta previa grade I. We apply correlations and find that there is no correlation between age and grades of placenta previa; placenta previa grading and pervious pregnancies in scarred group respectively, while a significant correlation is between grades of placenta previa and number of previous Cesarean sections in scarred group. There is a highly significant correlation between previous pregnancies and grades of placenta previa in all included population. While for unscarred group there is non significant correlation between age and placenta previa grades and a significant correlation between grades of placenta previa and previous pregnancies. Then we apply paired sample T Test on placenta previa grading of scarred and unscarred group which shows that there is no correlation between placenta previa grading of both groups but highly significant difference between them as shown in tables

Table 1: Correlation between different groups.

Variables Pair	Pearson Correlation (r)	Significance (p-value)
Age of Scarred Group & Grading of Scarred Group	0.299	0.055
Grading of Scarred Group & Previous Pregnancies (Scarred)	0.289	0.064
Grading of Scarred Group & Cesarean Sections	0.367	0.017
Previous Pregnancies & Placenta Previa Grading	0.480	0.000
Age of Unscarred Group & Grading of Unscarred Group	0.019	0.904
Grading of Unscarred Group & Previous Pregnancies (Unscarred)	0.456	0.002

Table2: Paired Sample T-Test between scarred and unscarred group

	Correlation	Sig.	Sig. (2-tailed)	T
Grading of Scarred Group & Grading of Unscarred Group	-.128	.418	.000	5.643

Discussions

Our study was undertaken to determine the sonographic association of placenta previa in scarred and unscarred uterus We collect data of 84 pregnant females with placenta previa diagnosed by

sonography, which is divided into two group the scarred group (having females with previous Cesarean section) (n=42) and the unscarred group (including females present without any previous Cesarean section) (n=42). In our study the females having placenta previa are of mean age 28.2 years which is comparable with previous studies by H. Tahseen et al. (2018) 23 having averages of 31 to 35 years of age. The reason behind the difference in ages is that the previous study only included patients of 30 to 40 years of age range while the in our study we took the age group of 19 to 45 as it is the crucial time period in a female's life when the tendency of becoming pregnant is higher. Because the Constitution of Pakistan, 1973, sets the minimum age for marriage for women at 18 years and above the age of 45 years the menstrual cycle of females begins to disturb and the possibilities of becoming pregnant is become harder. In this study 61% of cases presented before the age of 30 years compared to 61% of cases by Upreti R et al. (2020)57 and 77% of cases by Faiz et al. (2003)13 Our study showed that there is no correlation between age and the grades of placenta previa in both scarred and unscarred group.

Our study revealed that the mean grading of placenta previa is higher in scarred group (M=3.02) than the unscarred group (M=1.76). The findings show a notable difference in grades of placenta previa in the scarred and unscarred groups. The scarred group's higher mean score implies that scarring significantly affects the grades of placenta previa which may indicate a more severe or distinct condition than that of the unscarred group. There is more variation in the unscarred group's grading, as indicated by the difference in standard deviations. This could be because of individual evaluation disparities. These results are consistent with earlier studies that highlighted the variation in placenta previa grading caused by variations in placental position, cervical covering level, and ultrasound interpretation methods. Higher grades of placenta previa are linked to increased maternal and fetal risks, such as bleeding, preterm birth, and the necessity for a cesarean delivery, according to studies by Jauniaux et al. (2018)60 and Silver et al. (2019).61

The clinical significance of this difference is further supported by the significant t-value (5.643) found in our study, which shows that there is a systematic variance rather than random fluctuations between the both scarred and unscarred groups. Given the statistically significant p-value (.000), it is critical to analyze the underlying causes of these grading differences. Future research should investigate maternal anatomical variations, placental implantation sites, and the influence of previous uterine procedures. Improving training processes for ultrasound evaluation and implementing consistent grading guidelines may improve diagnostic accuracy and patient outcome.

Conflict of Interest

We believe that this manuscript is appropriate for publication by this journal. We have no conflicts of interest to disclose.

Ethical Statement

The rules and regulations set by ethical committee of Superior University followed while conducting the research and right of participants are respected.

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