

Ultrasound Evaluation of Placental Location among Women with Previous Cesarean Section in Sudan: A Cross-Sectional Study

Dr. Eman Hassan Kamal^{1*}, Safa Suliman Mustafa Abdo²

¹Al-Zaiem Al-Azhari University, Sudan

²Elmek Nimir University Hospital, Sudan

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*Corresponding author: Dr. Eman Hassan Kamal

Al-Zaiem Al-Azhari University, Sudan

Abstract

Original Research Article

Background: The increasing global rate of cesarean deliveries has raised concern regarding placental implantation abnormalities in subsequent pregnancies. This study aimed to evaluate the placental location in pregnant women with previous cesarean sections using ultrasound. **Methods:** A descriptive cross-sectional study was conducted at Elmek Nimir University Hospital, River Nile State, Sudan, from February to August 2025. A total of 150 pregnant women aged 18–40 years with a history of cesarean section were included. Placental location was assessed using transabdominal ultrasound with a full bladder. Placental sites were categorized as anterior, posterior, fundal, low-lying, or previa. Data were analyzed using SPSS version 20. **Results:** The majority of participants (37.3%) were aged 24–29 years, and 47.3% had one previous cesarean section. The most frequent placental sites were anterior (40.7%) and posterior (36%). A statistically significant association was found between the number of cesarean sections and placental site ($p = 0.001$). **Conclusion:** Most pregnant women with prior cesarean sections had anterior or posterior placental implantation. Routine ultrasound evaluation is essential for detecting abnormal placentation early, thereby improving maternal and fetal outcomes.

Keywords: Placenta location, Cesarean section, Ultrasound, Sudan, Placenta previa.

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INTRODUCTION

The global rise in cesarean deliveries has led to an increased focus on the consequences for placental implantation in subsequent pregnancies. Placental location plays a vital role in determining maternal and fetal outcomes, particularly among women with uterine scars. Ultrasound imaging, especially transvaginal and transabdominal approaches, remains the cornerstone for identifying risks such as placenta previa and placenta accreta spectrum (PAS). Placental implantation over a cesarean scar may predispose women to severe complications, including hemorrhage and uterine rupture. This study aimed to evaluate the placental location among women with previous cesarean sections in Sudan using ultrasound imaging.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted in the ultrasound departments of Elmek Nimir University Hospital, River Nile State, Sudan, from February to August 2025. The study included 150 pregnant women aged between 18 and 40 years with a

history of at least one cesarean section. Women without previous cesarean deliveries were excluded.

Ultrasound examinations were performed using a Mindray DC-40 (2024, China) machine with a 3.5 MHz convex transducer. Placental sites were recorded as anterior, posterior, fundal, low-lying, or previa. Data were collected using structured sheets and analyzed with SPSS version 20 (Chicago, USA). A chi-square test was applied to determine associations between the number of cesarean sections and placental location. Ethical approval was obtained from the hospital's research committee.

RESULTS

Out of 150 participants, the age range was 18–40 years, with a mean of 28.15 ± 5.25 years. Most participants (37.3%) were between 24–29 years old. Nearly half (47.3%) had one prior cesarean section, while 5.3% had five. Placental locations were distributed as follows: anterior (40.7%), posterior (36%), fundal (11.3%), low-lying (9.3%), and previa (2.7%). The chi-square test revealed a statistically significant relationship

between the number of previous cesarean sections and placental site ($p = 0.001$).

DISCUSSION

This study demonstrated that anterior and posterior placental locations were most common among women with prior cesarean sections. These findings align with studies by Tawfig *et al.*, (2022) and Vinod Kumar *et al.*, (2019), which also reported anterior and posterior predominance. The significant correlation between cesarean history and placental site underscores the influence of uterine scarring on implantation. Women with multiple cesarean sections are at higher risk for abnormal placentation, including placenta previa and accreta. Routine ultrasound surveillance, particularly in the second and third trimesters, is crucial for identifying high-risk cases early and optimizing delivery planning.

CONCLUSION AND RECOMMENDATIONS

This study concludes that anterior and posterior placental implantations are predominant among Sudanese women with previous cesarean sections. A significant association was found between the number of prior cesarean deliveries and placental site. Healthcare providers should perform regular ultrasound assessments for such patients to anticipate potential complications. Future research involving larger, multi-center samples is recommended to explore long-term maternal and fetal

outcomes related to cesarean history and placental positioning.

Author Contributions

Dr. Eman Hassan Kamal conceptualized, designed, and supervised the study. Safa Suliman Mustafa Abdo collected data, performed analysis, and prepared the initial draft. Both authors reviewed and approved the final manuscript.

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