The Egyptian Journal of Hospital Medicine (April 2024) Vol. 95, Page 2266- 2269

Comparison between Intrauterine Contraceptive Device Insertion during Cesarean Section and Postpartum Insertion

Ahmed Saber Soliman, Nermeen Ahmed Fouad Labib *,
Ayman Ahmed Abdel Hamid Shedid, Ashraf Nassif Elmantwe
Obstetrics and Gynecology Department, Faculty of Medicine, Benha University, Benha, Egypt.
* Corresponding author: Nermeen Ahmed Fouad Labib, Email: dr.nermeen19@gmail.com, Phone: +201004885799

ABSTRACT

Background: Intrauterine contraceptive device (IUD) insertion timing, particularly during cesarean section or postpartum, is a crucial consideration for effective contraception and patient satisfaction.

Objective: To compare the outcomes of IUD insertion during cesarean section versus delayed postpartum insertion in terms of retention, side effects, and patient satisfaction.

Patients and Methods: This prospective observational study involved 250 women aged 18-45 years with full-term pregnancies scheduled for cesarean delivery at Benha University Hospitals. Participants were randomly assigned into two groups: Group A (n=125) had IUD insertion during cesarean section, and Group B (n=125) had delayed IUD insertion; 8 weeks postpartum. Follow-up assessments at 3 months included quantitative serum pregnancy test, pelvic examination with transvaginal ultrasonography, side effects evaluation, and satisfaction measurement using a Visual Analog Scale (VAS).

Results: Abnormal bleeding occurred in 24% of Group A and 19.2% of Group B (p=0.356). Pain was reported by 24% in Group A and 16.8% in Group B (p=0.158). Retention rates were 84% for Group A and 92% for Group B (p=0.052). Expulsion rates showed no significant difference: partial expulsion occurred in 11% of Group A and 6% of Group B (p=0.18), complete expulsion in 5% of Group A and 2% of Group B (p=0.151). Group B had significantly higher strings visibility (96% vs. 16.8%, p<0.001) and higher VAS satisfaction scores (0.83±0.76 vs. 4.86±0.92, p<0.001).

Conclusion: Delayed postpartum IUD insertion results in higher retention rates and satisfaction compared to insertion during cesarean section. However, both methods are viable options for postpartum contraception.

Keywords: Intrauterine device; Cesarean section; Postpartum contraception; Retention rate; Patient satisfaction.

INTRODUCTION

The intrauterine device (IUD) is a highly utilized reversible contraceptive method, with around 100 million users globally. The long-term efficacy of IUDs, especially the TCu 380A and levonorgestrel (LNG) variants, is comparable to tubal sterilization while also being reversible [1].

The American College of Obstetricians and Gynecologists endorses long-acting reversible contraception (LARC) methods, including copper and LNG IUDs and contraceptive implants, as primary contraceptive options for adults [2-4].

Despite their advantages, IUDs have drawbacks such as expulsion rates and side effects like pain and bleeding, which can lead to early removal. Factors such as delivery method, IUD design, and timing of insertion significantly impact IUD outcomes and have been widely studied [5,6]. Postpartum women often do not receive contraception until their follow-up visit, usually 6-8 weeks post-delivery. This delay can increase the risk of rapid, repeat, and unintended pregnancies, as more than half of non-breastfeeding women ovulate by six weeks postpartum, and many are sexually active by this time [7-9].

IUD insertion during cesarean section, performed within ten minutes after placental delivery, has been explored in adult women for its convenience and efficacy. This approach overcomes many barriers associated with waiting several weeks post-delivery for IUD placement and ensures the woman is not pregnant at the time of insertion [10,11].

However, post-placental IUD placement leads to higher expulsion rates, ranging from 5.8% to 24%, compared to 2.9% to 3.5% for delayed postpartum insertion, which may reduce contraceptive effectiveness [12, 13].

This study aimed to compare between intrauterine contraceptive device insertion during cesarean section and postpartum insertion.

PATIENTS AND METHODS

Study Design and population:

This prospective observational study was conducted with 250 women in the Obstetrics and Gynecology Department at Benha University Hospitals and outpatient clinic. The study was done over a period of one year from September 2022 to August 2023.

The inclusion criteria included women aged 18-45 years with full-term pregnancies who were scheduled for cesarean delivery and desired postpartum IUD contraception. The exclusion criteria comprised women with uterine anomalies, malignancies, chorioamnionitis, intrapartum fever, or ruptured membranes for more than 24 hours before delivery, fetal anomalies, those who refused participation, and those with contraindications to IUD insertion.

Group Assignment and IUD Insertion Procedures

Participants were randomly divided into two groups: **Group A** (125 women) received IUD insertion during the cesarean section, while **Group B** (125 women) had delayed IUD insertion postpartum. In Group A, the IUD was inserted through the hysterotomy

Received:18/1/2024
Accepted:18/3/2024

site at the uterine fundus during the cesarean section. The inserter was removed, and a ring forceps was used to position the strings through the cervix into the vagina. The forceps were then removed to prevent contamination, and the site was closed. At 8 weeks, the presence of the IUD was checked via speculum examination and ultrasound if the strings were not visible. Group B women were scheduled for IUD insertion 8 weeks postpartum, provided they had no cervical or vaginal infections. Follow-up assessments were conducted 3 months after delivery for Group A and 3 months after IUD insertion for Group B.

Data Collection and Patient Histories

Follow-up data collection included quantitative serum pregnancy tests, pelvic examinations with transvaginal ultrasonography (TVUS), and monitoring for side effects such as bleeding, cramping, fever, and pain. Satisfaction was measured using a 10-cm Visual Analog Scale, and expulsion rates were recorded. Personal histories, including name, age, marital status, address, menstrual history (age of menarche, menstrual disturbances, dysmenorrhea, related symptoms), obstetric history, current chronic diseases, medications, past history of hypertension and diabetes, and family history of similar conditions, were documented.

Clinical Examinations:

Abdominal and local clinical examinations included inspection for signs of gastrointestinal pathology, such as scars, distension, or striae, and light palpation of the abdomen to assess for clinical signs. Vulvar examinations assessed developmental symmetry, hair growth distribution, skin abnormalities, and other issues.

Vaginal Examination:

Vaginal examinations involved visualizing the hymenal ring, relaxing the vaginal walls for speculum insertion, and evaluating for conditions like cystocele, urethrocele, and rectocele. The urethral examination checked for discharge, tenderness, erythema, and any prolapse of the meatus.

Sample Size Calculation:

The sample size calculation was based on a study by **Whitaker *et al.*** [14], using Epi Info STATCALC. Assumptions included a 95% two-sided confidence level, 80% power, and a 5% error margin, resulting in a calculated odds ratio of 1.115. The final sample size determined was 250.

Data Management and Statistical Analysis:

Data management and statistical analysis for this study were conducted using SPSS version 26 (IBM, Armonk, New York, United States). The normality of quantitative data was assessed using the Kolmogorov–Smirnov test, the Shapiro-Wilk test, and direct data visualization methods. Quantitative data were summarized as means and standard deviations. Categorical data were summarized as numbers and percentages. Comparisons of quantitative data between the study groups were performed using the independent t-test for normally distributed variables and the Mann-Whitney U test for non-normally distributed variables. Categorical data were compared using the Chi-square test. All statistical tests were two-sided, and p-values less than 0.05 were considered significant.

Ethical considerations

The study was done after being accepted by the Research Ethics Committee, Benha University. All patients provided written informed consents prior to their enrolment. The consent form explicitly outlined their agreement to participate in the study and for the publication of data, ensuring protection of their confidentiality and privacy. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

RESULTS

Distribution of demographic data and obstetrical history between the studied groups were reported in **Table 1**.

Table (1): Distribution of demographic data and obstetrical history between the studied groups.

	Group A (N=125)	Group B (N=125)	
Age (years)	29.5±6.9	28.9±6.5	
BMI (kg/m^2)	27.9± 4.02	27.6± 3.97	
Educational level			
High	66 (52.8%)	75 (60%)	
Low	59 (47.2%)	50 (40%)	
Residence			
Urban	61 (48.8%)	66 (52.8%)	
Rural	64 (51.2%)	59 (47.2%)	
Occupational condition			
Housewife	64 (51.2%)	69 (55.2%)	
Working	61 (48.8%)	56 (44.8%)	
Gravidity	2.86 ± 0.96	2.99 ± 1.2	0.345
Previous CS section	7 (5.6%)	6 (4.8%)	0.775
Previous abortion	4 (3.2%)	3 (2.4%)	0.701

BMI: body mass index.

This table shows that there was no statistically significant difference between studied groups according to abnormal bleeding, pain, PID and endometritis **(Table 2)**.

Table (2): Distribution of abnormal bleeding, pain, PID and endometritis between the studied groups.

	Group A (N=125)	Group B (N=125)	P value
Abnormal bleeding	30 (24%)	24 (19.2%)	**0.356**
Pain	30 (24%)	21 (16.8%)	**0.158**
Pelvic inflammatory disease (PID)	8 (6.4%)	4 (3.2%)	**0.237**
Endometritis	3 (2.4%)	1 (.8%)	**0.313**

This table shows that there was no statistically significant difference between studied groups according to IUD status **(Table 3)**.

Table (3): Distribution of IUD status between the studied groups.

	Group A (N=125)	Group B (N=125)	P value
Retained	105(84%)	115(92%)	0.052
Expulsed			
Partial	14(11%)	8(6%)	0.18
Complete	6(5%)	2(2%)	0.151

This table shows that there was no statistically significant difference between studied groups regarding causes of discontinuation or removal of IUCD **(Table 4)**.

Table (4): Distribution of causes of discontinuation or removal of IUCD between the studied groups.

	Group A (N=125)	Group B (N=125)	P value
Expulsion	14 (11.2%)	6 (4.8%)	0.062
Pain	1 (0.8%)	2 (1.6%)	0.561
Bleeding	4 (3.2%)	6 (4.8%)	0.519
Pelvic infection	1 (0.8%)	1 (0.8%)	1
Psychological	1 (0.8%)	0 (0%)	0.316
Pregnancy	1 (0.8%)	2 (1.6%)	0.561
Baby died	2 (1.6%)	0 (0%)	0.156

This table shows that there was no statistically significant difference between studied groups according to expulsion rate and vaginal bleeding while there was highly statistically significant difference between studied groups according to strings visibility. This table shows that there was highly statistically significant difference between studied groups regarding VAS score **(Table 5)**.

Table (5): Distribution of Follow up after 3rd months between the studied groups.

	Group A (N=125)	Group B (N=125)	P value
Expulsion rate	4 (3.2%)	3 (2.4%)	0.701
Vaginal bleeding	6 (4.8%)	4 (3.2%)	0.519
Strings visibility	21(16.8%)	120 (96%)	**<0.001***
VAS Score	4.86 ± 0.92	0.83 ± 0.76	**<0.001***

*: Significant.

DISCUSSION

Immediate post-placental IUD insertion, defined as placing the IUD within 10 minutes after delivery, offers several advantages including reduced discomfort, high acceptance, and overcoming significant barriers to long-term contraception, thereby increasing motivation for its use [15]. Inserting an IUD immediately after placental delivery during a cesarean section provides a reversible and effective long-term contraceptive option that does not interfere with lactation. This method also minimizes the pain associated with typical IUD insertion, and lochia can conceal any insertion-related bleeding, ensuring the woman is not pregnant and prioritizing contraception [16].

Our study revealed no statistically significant differences between the groups in terms of gravidity, previous cesarean sections, and previous abortions. These findings align with those of **Al Safty *et al.*** [17], who reported mean gravidity values of 2.86 for Group A and 2.97 for Group B, with no significant difference between the groups (P > 0.05). Similarly, **Salem *et al.*** [18] found no significant differences between the groups regarding gravidity and previous cesarean sections. Furthermore, **Elsokary *et al.*** [19] observed no significant differences in complications such as infection, bleeding, displacement, and method failure between the groups. Both groups exhibited low complication rates, with only one major complication (pelvic inflammatory disease) in each group, both managed successfully with conservative treatment.

Our study found no statistically significant difference between the groups in terms of IUD status, including retained and expelled (partial and complete) IUDs. These findings are consistent with those of **Al Safty *et al.*** [17], who reported that 85% of IUDs in Group I were retained and 15% were expelled, while in Group II, 92% were retained and 8% were expelled. Specifically, 11% of IUDs in Group I were partially expelled and 4% completely expelled, compared to 6% partial and 2% complete expulsions in Group II. Similarly, **Salem *et al.*** [18] found no significant differences in expulsion rates during follow-up visits at 1 week, 6 weeks, and 6 months post-insertion. The immediate group had expulsion rates of 3.2%, 3.3%, and 4.5%, respectively, while the conventional group had rates of 0%, 1.1%, and 3.3%, respectively.

Our study found no statistically significant difference between the groups regarding the causes of

IUD discontinuation or removal, including expulsion, pain, bleeding, pelvic infection, psychological reasons, pregnancy, and infant death. These findings align with those of **Salem *et al.* [18]**, who reported no significant differences between the groups in these parameters ($P > 0.05$). Additionally, our study showed no statistically significant difference between the groups in terms of expulsion rates and vaginal bleeding after three months of follow-up. However, there was a highly significant difference between the groups regarding string visibility ($p < 0.001$). **Salem *et al.* [18]** also observed a significant difference in string visibility, with rates of 7.4% at 1 week, 17.6% at 6 weeks, and 25% at 6 months in the immediate group, compared to 96.8%, 94.7%, and 85.9% in the conventional group, respectively. They also found no significant difference in expulsion rates and vaginal bleeding after six months of follow-up. Contrarily, **Elsokary *et al.* [19]** found no significant difference in pelvic pain severity between the groups, as measured by the VAS ($p = 0.769$).

This study has several limitations, including its observational design, which may introduce selection bias and limit the ability to establish causality. The relatively short follow-up period of three months may not capture long-term outcomes and complications associated with IUD use. Additionally, the single-center setting at Benha University Hospitals may limit the generalizability of the findings to broader populations. The reliance on self-reported data for certain measures, such as pain and satisfaction, could introduce reporting bias. Lastly, the exclusion criteria, particularly the exclusion of women with certain medical conditions, may limit the applicability of the results to all postpartum women.

CONCLUSIONS

Based on our finding we conclude that insertion of IUD during cesarean section is safe and effective with expected low expulsion, and high continuation rate as in conventional method (postpartum insertion). Also, we found that there was highly statistically significant difference between studied groups according to strings visibility and VAS score. Further studies are needed with larger scales are needed for conforming our results.

Financial support and sponsorship: Nil.
Conflict of interest: Nil.

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