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Original article

Post Placental Insertion of Different Types of Intrauterine Device During Cesarean Section versus Delayed Intrauterine Device Insertion in Sharkia Governorate

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Abstract:

Background: An intrauterine device (IUD) is a small, often T-shaped birth control device that is inserted into the uterus to prevent pregnancy. IUDs are one form of long-acting reversible birth control (LARC). This study's objective was to compare between post placental insertions of different types of IUD (PPIUD) during cesarean section versus delayed IUD (DIUD) insertion. **Methods:** This prospective interventional study was conducted on 300 women who delivered via uncomplicated cesarean section and seeking IUD contraception. Patients were divided into two equal groups: PPIUD group: women received post placental insertion of different types of IUD (50 received copper T, 50 received Nova T, and 50 received multiload). DIUD Group: women received delayed insertion of different types of IUD (50 received copper T, 50 received Nova T, and 50 received multiload). **Results:** At 12 months follow-up there was no statistically significant difference between the 2 groups as regards complications. As regards satisfaction rates, 129 were satisfied with the IUD in the DIUD group, and 118 were satisfied with the IUD in PPIUD, and this difference was not statistically significant ($p > 0.05$). Prevalence of outcomes according to type of device in patients in DIUD group, data was insignificant in all outcomes except bleeding. **Conclusions:** Post-placental insertion of IUD during a cesarean section appears to be a more effective and convenient method of contraception compared to delayed insertion of an IUD. This study showed that post-placental IUD insertion is associated with lower rates of expulsion, thread visibility and menorrhagia compared to delayed insertion.

Keywords: Post Placental Insertion; Intrauterine Device; Cesarean Section

Introduction

Unintended pregnancies are an important worldwide public health issue imposing socioeconomic burden on individuals and society. In the postpartum period, unintended/ mistimed pregnancies reduce the birth-to-pregnancy interval, negatively affecting maternal health and perinatal outcomes in addition to increasing rates of infant and children morbidity and mortality [(1)].

An intrauterine device (IUD) is a small, often T-shaped birth control device that is inserted into the uterus to prevent pregnancy. IUDs are one form of long-acting reversible birth control (LARC). Among birth control methods, IUDs, along with other contraceptive implants, result in the greatest satisfaction among users. Once uterine depth is determined, following package instructions for the specific IUD being inserted. Once IUD is inserted, and strings are visible, strings are cut to a length of 3 cm to 4 cm with sharp scissors. Tenaculum are removed and make sure there is no bleeding from the site of the tenaculum, and remove the speculum [(2)].

Post-placental IUD (PPIUD) insertion is the insertion of an IUD in the endometrial cavity shortly after the delivery of placenta. It is termed as immediate when inserted within 10 min of delivery of placenta or early postpartum when inserted within <48 h after delivery. Insertion of an IUD after delivery may avoid the discomfort related to delayed insertion (DIUD), and any bleeding from insertion will be disguised by lochia [(3,4)].

The risk of spontaneous expulsion has been reported to be high in PPIUCD insertion in some studies. This disadvantage is outranked by the benefits of highly effective contraception immediately after delivery. Post-placental insertion has an expulsion rate ranging from 6 to 20% for T-shaped IUDs over 1 year, whereas the expulsion rate associated with interval insertion of T-shaped IUDs is approximately 1–4.5% in the first year [(5)].

The expulsion rate is lower for immediate post-placental compared with early postpartum insertion and is also lower when skilled health care providers insert the IUD. The expulsion rate is not affected by the method of postpartum insertion, whether inserted by ring forceps or by hand. There is high susceptibility (10–44%) of unintended pregnancy in the first postpartum year [(6)].

Anovulatory infertility lasts approximately 5 weeks in nonlactating women and more than 8 weeks in fully lactating women. The lactational pregnancy rate is approximately 1–2% at 1 year postpartum. Postpartum IUD insertion is an opportunity which is not to be missed particularly in developing countries like ours where delivery may be the only time when a healthy woman encounters health care provider. There are several reasons that make PPIUCD insertion an attractive option [(3)].

Access to safe and effective contraceptive services in the postpartum period would enable women to space their births and prevent unintended pregnancies, thereby averting maternal and child mortality. Factors contributing to a postpartum woman's vulnerability to pregnancy include return of menses, less breastfeeding and the lack of contraception [(7)].

This study aimed to compare between post placental insertions of different types of intrauterine device during cesarean section

versus delayed intrauterine device insertion.

Patients and Methods

This prospective interventional study was conducted on 300 Women who delivered via uncomplicated cesarean section and seeking IUD contraception. The study participants were recruited from the outpatient obstetrics clinics of Deyerb Negm Central Hospital, Faculty of Medicine, Benha University. The study was done over a period of one year from January 2022 to January 2023.

Approval of the study protocol by an Ethical Scientific Committee of Benha University was obtained (Ms.24.4.2022). Informed verbal and written consent were obtained from the patients before enrollment in the study.

Inclusion criteria were women aged 20 years old or more, uncomplicated cesarean section, willing for insertion of different types of IUD (Copper T, Nova T, and multiload), and agreed to report for follow-up.

Exclusion criteria were chorioamnionitis, prolonged rupture of membranes >18 h, unresolved PPH, uterine anomaly, cervical carcinoma, leiomyoma more than one or greater than 3 cm or impinging on uterine cavity, and those treated for gonorrhea, chlamydia, trichomoniasis during pregnancy.

All patients subdivided into two groups: PPIUD group: 150 women received post placental insertion of different types of IUD (50 received copper T, 50 received Nova T, 50 received multiload). DIUD group: 150 women received delayed insertion of different types of IUD (50 received copper T, 50 received Nova T, 50 received multiload).

All patients were subjected to a) Personal history and socio-economic status: name, age, parity, residence, occupation, economic status. B) Menstrual history: menarche, and details of menstrual cycles. C) Obstetric history: including number of pregnancies and deliveries, mode of delivery, and previous obstetric complications. D) Medical history: including diabetes mellitus, hypertension, and other medical conditions. E) Antenatal counseling and consent: All women have been counseled about contraception throughout prenatal care with a full description of different methods of contraception, different types of IUCDs, and the advantages and disadvantages of each of them. F) Examination: All study participants underwent a complete general examination and pelvic examination. G) Investigations: Pelvic ultrasound evaluation for thorough assessment of uterus and ovaries. Transvaginal sonography (TVS) was performed in all participants to confirm the position of the IUD.

Surgical Technique

***Post-Placental IUD Insertion:** After delivery of the fetus and placenta through a lower uterine segment incision, the interior aspect of the uterus was cleaned to ensure no remaining parts of the membranes were left. The uterine cavity was inspected for presence of malformations, which would be contraindication for use of IUCD.

The Uterus was stabilized by grasping it at fundus. Insertion was done after delivery of placenta. IUCD was held between middle and index finger, it was placed into the uterus through uterine incision and was left at fundus of uterus. Strings can be pointed towards the cervix and leave it lower down in the uterine cavity directed

towards the lower uterine segment without disturbing IUCD's position. The threads were cut approximately 2 cm beyond the external os and missing threads were recorded.

***Delayed IUD Insertion (Withdrawal Technique)**

Under aseptic precaution pelvic examination was done. Size and position of the uterus were identified. Any adnexal pathologies were ruled out and were evaluated if abnormalities are present. If any abnormal mucopurulent discharge was present, it was treated before IUCD insertion. Under aseptic precaution perineal parts prepared and draped with povidone iodine. Grasp the cervix with vulsellum. The cervical canal and uterine cavity were first straightened by applying gentle traction on the vulsellum. The uterus was sounded to identify the depth and direction of the uterus.

No Touch Technique: Open the IUD then the arms of the T were placed inside the insertion tube by folding the arms. Fix the flange according to utero-cervical length. Align the flange and the folded arms of the T in horizontal position. Insert the IUCD within 5 minutes of loading. Insert the loaded IUCD into the cervical os at appropriate angle and advance it into the uterine cavity till resistance felt. Hold the vulsellum and insertion rod stationary and withdraw the insertion tube till it touches the plunger rod such that IUCD would release into the uterine cavity. Plunger was removed then the insertion tube was removed to prevent accidental displacement and expulsion of IUD.

The marker tail was cut 2 cm from the external os, vulsellum removed, observed for bleeding from the vulsellum puncture sites, and hemostasis checked speculum removed. Women were advised to report any apparent adverse effects promptly.

Outcome Measurements and Follow-up

Before discharge, patients were given a card including the intervention done (date & procedure), the follow-up schedule and investigator contact. Duration of follow up: At 6 weeks, 6 and 12 months.

The primary outcome: The presence of the IUD in situ by ultrasonography at 6 weeks, 6 and 12 months of insertion.

The Secondary outcomes: Complications including heavy puerperal bleeding, menorrhagia or metrorrhagia, recurrent back pain or abdominal pain, infections either PID or endometritis, pregnancy rate, discontinuation of the IUD usage, satisfaction rate.

Pregnancy was determined by taking a medical history (e.g., missed periods), a pregnancy test, ßHCG titration, and an ultrasound. Pain was assessed (with exclusion of first postoperative day) depending on visual analogue scale (VAS) with score greater than 45. Amount of post-insertion bleeding: subjective estimation depending on patients and drop of hemoglobin. Endometritis was defined as chills, fever (temperature N38°C), foul-smelling lochia, spontaneous uterine discomfort or tenderness, and/or delayed uterine involution. PID was confirmed by transvaginal sonography showing thickened fluid filled tubes or tubo-ovarian complex (cysts, abscesses). An expulsion was defined as no IUD within the uterus, either with a clinical history consistent with an IUD expulsion or confirmed by trans-vaginal ultrasonography. Women were considered satisfied with their IUD if they responded yes to the question: "Would you recommend an IUD as a method of contraception to a friend?" Women were contacted after each missed

study visit. We made at least 5 attempts to contact women by phone or email before they were considered lost during follow-up.

Statistical analysis:

Comparison of continuous variables between the study groups was done using Student's t test for independent samples. Categorical data were compared using X2 tests; exact tests were used when the expected frequency was less than 5. Estimation of the odds ratio (OR) with its 95% confidence interval (CI) was done for all outcome comparisons between the two groups. A *p*-value <0.05 was considered statistically significant. All statistical calculations were done using IBM SPSS Statistics for Windows, version 22 (IBM, Armonk, NY, USA).

Results

This study included 300 women, divided into two groups. The first group (DIUD) included 150 women that receive delayed insertion of IUD; their ages ranged from 20-35 years, with a mean±SD of 26.9 years± 4.58. The second group (PPIUD) included 150 women that received post placental insertion of different types of IUD. Their ages ranged from 20 to 35 years, with a mean±SD of 27.71 years± 4.84.

Demographic and obstetric history among studied groups were mentioned in table 1 and 2 with no statistically significant difference between the 2 groups (p>0.05).

Data showed significant difference (p<0.05) between the 2 groups in the occurrence of bleeding and back pain in the first 6 weeks, as 33.3% of women in the DIUD group had moderate bleeding in comparison to 21.3% of women in the PPIUD group, and 46.7% of women in DIUD had back pain in comparison to 34% of women in PPIUD. There was no significant difference between the 2 groups regarding infection ((p>0.05)). On evaluation of the participants at the 12th month post-IUD insertion, 5 patients in the DIUD group and 7 patients in the PPIUD group had missed the follow up visits.

There was no significant difference (p>0.05) between the 2 groups regarding bleeding, pain, infections, or IUD expulsion rates) Table, 3).

Table 1: Demographic data of the studied groups.

Variable		PPIUD (n=150)	DIUD (n=150)	*p*-value
Age (years)	*mean±SD*	26.9 ± 4.58	27.7 ± 4.84	0.8
Occupation N. (%)	Housewife	129 (86%)	125 (83.3%)	
	Working	21 (14%)	25 (16.7%)	0.5
Education N. (%)	Illiterate/Preparatory	64 (42.7%)	59 (39.3%)	
	University/Higher	86 (57.3%)	91 (60.7%)	0.6
Economic status N. (%)	Low	70 (46.7%)	71 (47.3%)	
	Mid	57 (38%)	59 (39.3%)	0.8
	High	23 (15.3%)	20 (13.3%)	
Residence N. (%)	Rural	missing numbers	85 (56.7%)	0.6
	Urban		65 (43.3%)	

SD: Standard deviation; %; percentage; *p* value >0.05 not significant; *p* value ≤0.05 significant; IUD: Intrauterine device; N.: number; PPIUD; DIUD

Table 2: Obstetric history among the studied groups.

Variable	PPIUD (n=150)	DIUD (n=150)	*p*-value
Parity *mean±SD*	2.13 ± 0.85	2.35 ± 1.08	0.6
Gravidity *mean±SD*	3.15 ± 1.22	2.89 ± 1.24	0.8
Previous IUD N. (%)	52 (34.7%)	61 (40.7%)	0.2
Previous unplanned pregnancy N. (%)	82 (54.7%)	74 (49.3%)	0.2
Family planning counseling N.% ()	59 (39.3%)	51 (34%)	0.3
Future fertility desire N. (%)	76 (50.7%)	65 (43.3%)	0.2

Data are presented in mean ± SD or frequency (%). P value >0.05 not significant. P value ≤0.05 significant. IUD: Intrauterine device. N.: number

Table 3: Complications among the two groups.

Follow up	Variable		DIUD (n=150)	PPIUD (n=150)	*p*-value
At 6 weeks	**Bleeding (N.%)**	Moderate	50 (33.3%)	32 (21.3%)	**0.03**
		Severe	17 (11.3%)	14 (9.3%)	0.7
	Pain N. (%)	Back pain	70 (46.7%)	51 (34%)	**0.02**
		Abdominal pain	55 (36.7%)	69 (46%)	0.1
	Infection N. (%)	Endometritis	32 (21.3%)	30 (20%)	0.8
		PID	8 (5.3%)	11 (7.3%)	0.6
	IUD Expulsion	N. (%)	0 (0%)	0 (0%)	-
At 12 months	**Bleeding (N.%)**	Menorrhagia	21 (14.5%)	18 (12.7%)	0.7
		Metrorrhagia	14 (9.7%)	6 (4.2%)	0.07
	Pain N. (%)	Back pain	39 (26.9%)	28 (19.7%)	0.2
		Abdominal pain	44 (30.3%)	32 (22.5%)	0.06
	Infections N. (%)	Endometritis	22 (15.2%)	15 (10.6%)	0.2
		PID	11 (7.6%)	8 (5.6%)	0.5
	IUD Expulsion	N.%	0 (0%)	2 (1.4%)	0.2

Data are presented in mean ± SD or frequency (%). P value >0.05 not significant. P value ≤0.05 significant. IUD: Intrauterine device. N.: number

In the DIUD group, 144 women continued on the IUD, 2 patients had IUD expulsions, 2 women became pregnant on top of the IUD, and 2 patients missed the follow-up visits as they travelled aboard. While in the PPIUD, 139 women continued on the IUD, 6 women had IUD expulsion, 1 female got pregnant on top of the IUD, 3 women removed the IUD due to recurrent bleeding or infections, and 1 female missed the follow-up. As regards satisfaction rates, 129 were satisfied with the IUD in the DIUD group, and 118 were satisfied with the IUD in PPIUD, and this difference was insignificant (p >0.05) (Table, 4).

There was no significant difference regarding the complications of IUD in PPIUD group between different types of the IUD at 6 weeks follow up except for bleeding which was more with copper T and Nova T IUDs in comparison to multiload IUD (p <0.05). While no significant difference(p>0.05) in complications between different types of IUDs at the 12th month of follow-up (Table, 5).

Table 4: Outcome results in both groups.

Variable	DIUD (n=150)	PPIUD (n=150)	*p*-value
Continuation N. (%):	144 (96%)	139 (92.7%)	0.2
Discontinuation N. (%):			
Expulsion	2 (1.3%)	6 (4%)	0.2
Pregnancy	2 (1.3%)	1 (0.7%)	0.7
Missed follow up/Removal	2 (1.3%)	4 (2.7%)	0.4
Overall Satisfaction N. (%)	129 (86%)	118 (78.7%)	0.09

Data are presented in mean ± SD or frequency (%). P value >0.05 not significant. P value ≤0.05 significant. IUD: Intrauterine device. N.: number

Table 5: Complications as regard type of IUD in PPIUD group at 6 weeks.

Follow up	Variable	Copper T (n=50)	Nova T (n=50)	Multiload (n=50)	*p*-value
At 6 weeks	**Bleeding N. (%)**				
	Moderate (n=32)	15 (30%)	12 (24%)	5 (10%)	**0.04**
	Severe (n=14)	6 (12%)	5 (10%)	3 (6%)	0.6
	Pain N. (%)				
	Back pain (n=51)	18 (36%)	20 (40%)	13 (26%)	0.3
	Abd. pain (n=69)	22 (44%)	20 (40%)	27 (54%)	0.4
	Infection N. (%)				
	Endometritis (n=30)	12 (24%)	13 (26%)	5 (10%)	0.09
	PID (n=11)	4 (8%)	4 (8%)	3 (6%)	0.9
At 12 months	**Bleeding N. (%)**				
	Mennorrhagia (n=18)	6 (12.2%)	8 (16.7%)	4 (8.5%)	0.5
	Metrorrhgia (n=6)	3 (6.1%)	1 (2.1%)	2 (4.3%)	0.6
	Pain N. (%)				
	Back pain (n=28)	9 (18.4%)	11 (22.9%)	8 (17%)	0.7
	Abdominal pain (n=32)	11 (22.4%)	9 (18.7%)	12(25.5%)	0.7
	Pelvic infections N. (%)				
	Endometritis (n=15)	6 (12.2%)	4 (8.3%)	5 (10.6%)	0.8
	PID (n=8)	3 (6.1%)	2 (4.2%)	3 (2.1%)	0.9
	IUD Expulsion (n=2)	1 (2%)	0 (0%)	1 (2.1%)	0.6
	Pregnancy on top (n=1) **N. (%)**	0 (0%)	1 (2.1%)	0 (0%)	0.4

Data are presented in mean ± SD or frequency (%). P value >0.05 not significant. P value ≤0.05 significant. IUD: Intrauterine device. N.: number

Discussion

An intrauterine device (IUD) is a coitus-independent, reversible and effective form of contraception with immediate contraceptive action. It is the most widely used method of contraception with approximately 160 million users worldwide [(8)].

In the current study, a comparison between the 2 groups was done at 6 weeks, 6 months and 12 months follow up visits, in order to compare the incidence of IUD related complications as bleeding, pain and infection.

The current study showed a significant difference in bleeding and back pain in 6 weeks follow up. As bleeding and pain were more evident in DIUD group in comparison to PPIUD group (33.3% vs 21.3% respectively, p=0.03) for bleeding and (46.7% vs 34% respectively, p=0.02) for pain. There was no significant difference between the 2 groups regarding infection occurrence (p >0.05).

These findings agreed with a study which compared PPIUD versus DIUD; they also

reported a higher incidence of pain at 6 weeks follow up in DIUD in comparison to PPIUD (16.3% vs 8.7% respectively, *p*=0.02) and bleeding was more evident in DIUD group in comparison to PPIUD (15.4% vs 5.09% respectively, *p*=0.007), and no cases were reported with PID in either groups [3].

Unlike to our results, a study reported no significant difference between the 2 groups as regards bleeding and pain at first week and 6 weeks follow up visit. They used only Copper T 380A IUD in their study unlike to our study where we used different types of IUD [9].

At 12 months follow up our results revealed no significant differences between the 2 groups in all observed complications such as bleeding, pain, infection, IUD expulsion. Our results were supported by a study that reported that there was no substantial variation in immediate post-placental group and delayed IUD insertion group according abnormal bleeding, pain, PID or endometritis [10]. Our findings also agreed with a study which reported no significant difference between the 2 groups as regards pain, bleeding, and infection rate [11].

Also, the current study findings were nearly agreed with another study that reported that the difference in the two groups regarding bleeding, pain and infection, were statistically significant at 6 weeks, but were insignificant at 1 year [3].

As regards the current study final outcomes, expulsion rate was higher in PPIUD (4%) in comparison to DIUD group (1.3%), although this difference was statistically insignificant. Also, there was insignificant difference between both groups regarding pregnancy rate on top of the IUD (*p*=0.7).

As regards overall satisfaction rate in DIUD and PPIUD, it was 88.9% vs. 83.1% respectively with insignificant difference between the 2 groups (*p*=0.09). In the current study, the discontinuation rate at 3, 6, 12 months of follow up periods were similar in both groups.

These findings were like another study that reported an expulsion rate of 1.96% in DIUD in comparison to 4.17% in PPIUD, with no significant difference between the 2 groups (*p*=0.5). Also, they reported insignificant difference between the 2 studied groups as regards pregnancy on top of the IUD [11].

A study reported higher expulsion rate, where in group I (PPIUD group), 85% patients were retained, and 15 % were expulsed. On the other hand, IUDs in group II (DIUD group), 92% patients were retained, 8% were expulsed. There was no statistical significance between the studied groups regarding expulsion [10].

A study reported a significant difference between the 2 groups in IUD expulsion rates at 6 months follow up visit (5.8% in PPIUD group versus 2.8% in DIUD group, with *p*=0.01), in contrast to 12 months follow up visit where 2.8% in PPIUD versus 1.5% in DIUD group, *p*>0.05 with no significant differences between the 2 groups. Also, they recorded no unintended pregnancies in either groups at 6 weeks or 6 months post IUD insertion, while contraceptive failure with pregnancy was noted in one patient in the PPIUD group between 6 months and 1 year. This was due to an unnoticed expulsion of the IUD and was confirmed by USG [3].

As regards the overall satisfaction rates, a study reported that the satisfaction rate of cases with IUD was high in both groups with 90.20% and 91.67% in immediate

and delayed insertion groups respectively [11].

The current study showed that prevalence outcomes according to type of device in patients in DIUD group. Data was insignificant in all outcomes except bleeding. 15 patients with Copper T had moderate bleeding while 12 patients with Nova T and 5 patients with multiload type. While prevalence of outcomes according to type of device in patients in PPIUD group at 12 months; data was insignificant in accidental pregnancy, bleeding, infections and pain. Multiload type showed lowest incidence of most of these outcomes.

A study reported that there were no unwanted pregnancies, or an acute complication related to the insertion of the IUD and who suggest that immediate post placental insertion of Copper IUD was a safe and effective method [12]. Another study reported that there were no a significant difference between groups regarding expulsion, abnormal bleeding, pain and other adverse events [10].

Strengths of our study are the large sample size compared with most of previous RCTs done and the high follow-up rate, largely achieved by professional study staff getting accurate contact information. The weakness of the study was not looking for the factors that contribute to expulsion rate e.g., provider experience, technique of insertion that could be modified and may help to minimize expulsion in clinical practice. Moreover, the study was difficult to be blinded.

Conclusion

Based on the available evidence, post-placental insertion of an intrauterine device (IUD) during a cesarean section appears to be a more effective and convenient method of contraception compared to delayed insertion of an IUD. Our study has shown that post-placental IUD insertion is associated with lower rates of expulsion and complications compared to delayed insertion. Delaying IUD insertion requires an additional appointment, which may increase the likelihood of non-compliance. On the other hand, post-placental insertion does require additional training for healthcare providers and may not be feasible for all women.

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