Research Article

Postplacental IUD Insertion Using Ring Forceps versus Push and Push Technique

Insersi IUD Pascaplasenta Persalinan Pervaginam Menggunakan Teknik Ring Forceps dan Teknik Push and Push

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Abstract

Objective: To compare IUD-endometrium (ED) distance and the incident of malposition postplacental CuT-380A IUD insertion in vaginal delivery between ring forceps technique and push and push technique.

Method: This study was a double-blind randomized control trial, performed in September 2014 until March 2015 at Dr. Kariadi Hospital. Ring forceps and push and push insertion technique groups consisted of 25 subjects in each group. Follow-up was performed at 1-2 weeks, 6-8 weeks and >12 weeks after insertion.

Result: The mean of IUD-ED distance in push and push group was shorter (but not statistically significant) than ring forceps group. The IUD-ED distance was at 1-2-week follow-up 4.1 (2.2) vs. 4.9 (3.4) mm; p=0.208, at 6-8-week follow-up: 2.6 (1.8) vs. 3.2 (3.7) mm; p=0.452, and at > 12-week follow-up: 0.9 (0.8) vs. 1.0 (0.9) mm; p=0.427, respectively. Malposition was found in 1-2-week follow-up, but the IUD was changed to the normal position (sagital position in uterine fundus) at 6-8-week and >12-week follow-up. Up to 3 months of follow-up, there was no occurrence of perforation, expulsion or pregnancy in both groups. Most of subjects (56% in the ring forceps, 68% in push and push groups) did not feel painful during IUD insertion.

Conclusion: Push and push insertion technique clinically tends to produce IUD-ED distance shorter than ring forceps technique. Both techniques are comfortable, safe and effective.

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Keywords: immediate postplacental IUD insertion technique, IUD-endometrium distance, IUD malposition, push and push technique, ring forceps technique

Abstrak

***Tujuan**: Membandingkan jarak IUD-endometrium (ED) dan kejadian malposisi pada insersi IUD CuT-380A pascaplasenta pada persalinan pervaginam antara teknik 'ring forceps' dan teknik 'push and push'.*

***Metode**: Penelitian ini merupakan uji klinis tersamar ganda, dilakukan pada bulan September 2014 hingga Maret 2015 di RSUP Dr. Kariadi. Kelompok 'ring forceps' dan kelompok 'push and push' masing-masing terdiri dari 25 subjek. Pemantauan dilakukan pada 1-2 minggu, 6-8 minggu dan >12 minggu pascainsersi.*

***Hasil**: Rerata jarak IUD-endometrium kelompok 'push and push' lebih pendek daripada kelompok 'ring forceps', tetapi tidak bermakna secara statistik. Masing-masing pada 1-2 minggu pascainsersi 4,1 (2,2) vs 4,9 (3,4) mm; p=0,208, 6-8 minggu pemantauan: 2,6 (1,8) vs 3,1 (3,7) mm; p=0,452 dan pada >12 minggu: 0,9 (0,8) vs 1,0 (0.9) mm; p=0,427. Kejadian malposisi ditemukan dalam 1-2 minggu pemantauan (satu subjek dalam setiap kelompok), tetapi pada pemantauan 6-8 minggu dan >12 minggu telah berubah menjadi posisi normal (posisi IUD sagital pada fundus uteri). Sampai dengan 3 bulan pemantauan tidak didapatkan kejadian perforasi, ekspulsi maupun kehamilan pada kedua kelompok. Sebagian besar subjek (56% pada kelompok 'ring forceps' dan 68% pada kelompok 'push and push') setelah insersi dilakukan menyatakan bahwa prosedur insersi terasa tapi tidak nyeri.*

***Kesimpulan**: Teknik insersi push and push cenderung menghasilkan jarak IUD-endometrium yang lebih pendek daripada teknik ring forceps. Kedua teknik tersebut merupakan prosedur yang nyaman, aman dan efektif.*

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***Kata kunci**: IUD pascaplasenta, jarak IUD-endometrium, malposisi IUD, teknik insersi 'ring forceps', teknik 'push and push'*

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INTRODUCTION

The high rate of growth population (1.49%) and maternal mortality rate (MMR) (359/100,000) in Indonesia increase the awareness of family planning program. Long acting reversible contraceptives (LARC) device is one of choices for the family planning program.[1-3] High unmet need, short birth spacing and high discontinuitation rates are associated with the increased risk of maternal and perinatal morbidity and mortality.[4] Intrauterine device (IUD) as a long acting reversible contraceptive device is the best choice for postpartum women.[5] This device has some advantages including not interfering with lactation, performing as soon after placental delivery, protecting against unwanted pregnancy, maintaining birth spacing, not disrupt-

ing to mothers activity while taking care of their babies.[6,7] Additionally, IUD also has high effectivity, safety, and excellent reversibility.[8]

According to study by *Badan Koordinasi Keluarga Berencana Nasional* (BKKBN) about postpartum and post-miscarriage contraceptive service at 22 hospitals in 14 provinces from 2008 to 2009, the rate of using contraception was only 5-10%. It proved that the women lacked of concern to this service.[9]

The side effects and complications of IUD are not protecting from sexual transmitted diseases, more prone to malposition and perforation. The most frequent cause of IUD failure is an expulsion. Factors that affect the occurrence of expulsion is the clinical skills competency of operator and timing of insertion.[10,11] The insertion of IUD can be performed immediately after placental delivery/ immediate post placental insertion (IPPI), 48 hours postpartum/immediate postpartum (IPP), 4 to 8 weeks postpartum/late postpartum insertion and interval insertion.[8,12,13] Most of women still prefers to interval insertion, due to low expulsion rate (3-13%) compared with postpartum insertion, IPPI (9.5 to 12.5%), IPP (25-37%). Meanwhile, late postpartum insertion is not recommended because of high rates of expulsion and perforation.[14] However, postpartum insertion, especially IPPI, has some advantages compared with interval insertion, namely increasing the participation rate because it is inserted directly postpartum, minimalizing the painful sensation and certainly, patients feel safety.

An observational cohort study in Dr. Cipto Mangunkusumo General Hospital in 1994, the doctors inserted the MLCU-250 IUD using fore and middle fingers to the uterine cavity as soon as possible after placental delivery. After three-month follow-up, the expulsion rate was 7.1% of the 75 subjects; however, the loss to follow-up patients reached 40%.[15] Xu in 1996 compared between postplacental CuT-380A IUD insertion using finger and ring forceps; the result showed there were no significant differences in the numbers of IUD expulsion (13.3% for finger and 12.7% for ring forceps).[16] Since 2009, in Dr. Kariadi Hospital Semarang, Hary Tjahjanto introduced two techniques of postplacental CuT-380A IUD insertion by blinding method. In the beginning, insertion technique that had been used on postplacental service was using ring forceps (10 inches or 25.5 cm length) and a new modification insertion technique was applied using combination of ring forceps and standard IUD inserter (standard inserter tube and plunger rod). It is known as push and push technique. During insertion procedure, insertion consists of three steps to puss the ring forceps and standard inserter into uterine cavity to reach the center of uterine fundus. Automatically, the IUD horizontal arm enters the narrow gap between the anterior and posterior wall of uterine fundus; finally, it can attach to the endometrium of the uterine fundus. The prospective cohort study including 108 subjects with the length of follow-up ≥ 12 months, showed the satisficating results (no occurrence of pregnancy, continuation rate reached 94.1%, and expulsion rate was low (2.86%). There was no perforation reported and only 5.6% patients lost to follow-up.[17] The aim of this study is to compare IUD to endometrium distance and the incident of malposition postplacental CuT-380A IUD between ring forceps and push and push technique.

METHODS

This double blind randomized controlled trial study was performed in Obstetrics and Gynecology Department Dr. Kariadi Hospital Semarang from September 2014 to March 2015. There were 50 women consisting of 25 women for each group (ring forceps and push and push technique). The inclusion criteria were women delivering vaginally, approving to be the participants and willing to undergo the procedure until 3 months of follow-up for the IUD insertion. Apart from that, we included all women with gestational age ≥37 weeks, Hb ≥8 g%, body mass index <40 kg/m^2, birth weight <4,000 g, the residence of the Semarang to ease the follow-up. The exclusion criteria were premature rupture of membranes ≥18 hours, body temperature ≥38°C, purulent vaginal discharge, tumors or genital tract malignancy, postpartum hemorrhage, total perineal rupture, history of diabetes mellitus, blood clotting disorders, and failure of using IUD previously.

Insertion Procedures

Push and push insertion technique

Preparation: Cutting the IUD strings about 6 cm from the end of vertical stem or in the middle of a long string. The string and vertical stem is inserted

into the tube IUD inserter, the horizontal arm of the IUD remains outside of the tube inserter yet. Entering the plunger rod into the inserter tube, clamped inserter tube within a position tip of ring forceps in line with the horizontal arm or slightly lower than the outer edge of ring forceps tip (Figure 1). Cleaning with the antiseptic solution for the pubic area, labia, perineum, vaginal wall and cervix.

Procedures: Firstly, exploring the uterine cavity for the rest of amnion membrane and residual blood clot by using the fore and middle fingers of the right hand (or dominant hand). In supine position, inserting the two fingers into the vagina up to the fingertips touching the edge of the muscle wall of the uterine corpus (fibromusculair junction/FMJ). Fore and middle fingers widen opening the FMJ circle, push down the palms (keep in supination position) to open the vagina. By using the no-touch technique, the left hand hold the ring forceps, bring the ring forceps to insert the tip of the forceps ring along the base of the fore and middle fingers between the fingers until it reaches the circular opening of FMJ. After the end of ring forceps moves toward the uterine cavity, using the fingers of the right hand (first, fourth, and fifth fingers) to hold the ring forceps to maintain the position of it (Figure 2). Then, using the left hand to push the ring forceps to move more getting into uterine cavity, while the fingers of the right hand direct and maintain the position of the ring forceps. After that, the left hand presses the fundus and using the right hand to push the ring forceps to move more getting into uterine cavity. Performing repeatedly until the end of the ring forceps reaches the fundus and we can feel the pressure on palpation of the fundus using the left hand. The next step is holding the inserter by the left hand, opening the ring forceps using the right hand (opening width 1-2 cm), and pushing the inserter tube to the uterine fundus wall. After that, holding and maintaining inserter position by using left hand, removing ring forceps, and pushing the inserter tube using right hand so that the tube inserter tip moves into the narrow gap between the anterior and posterior uterine fundus wall in conjunction with fundus control using the left hand. Holding the plunger rod using the right hand, followed by pulling inserter tube so that the proximal end of the tube touches ring the plunger rod. Finally, pulling out the plunger rod out of inserter tube and the inserter tube from the uterine cavity.

Besides, we enter the ring forceps slowly into the uterine cavity and push the ring forceps and stardard inserter after the insertion of the IUD in the center of fundus. The ring forceps and the inserter are inserted into the uterine cavity to reach the fundus. Then, when the ring forceps is opened, the inserter is encouraged to move in the gap of fundus wall and after the ring forceps is removed from the uterine cavity, the inserter is driven again to make sure the attachment on the uterine fundus wall. Pushing the ring forceps or inserter tube must be accompanied by fundus palpation on the abdominal wall with left hand. It aims to ensure the position of ring forceps tip on the fundus and prevent perforation.

We have to make sure that the uterine cavity has been confirmed cleaned from blood clots and rest of the amnion to prevent the expulsion during puerperium period. Therefore, this insertion is not limited to the first 10 minutes after delivery of the placenta.

Figure 1. How to put the IUD in the inserter tube.

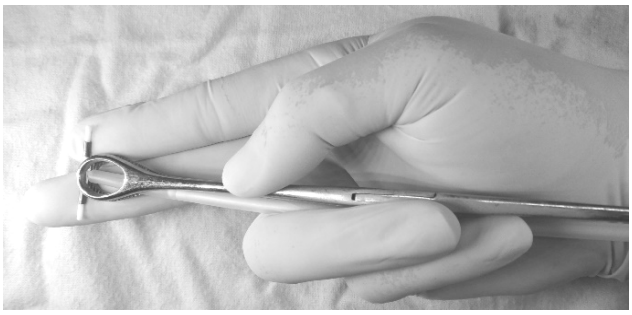

Figure 2. Fingers position of the right handfor holding the ring forceps.

Ring Forceps Insertion Technique

Insertion technique using ring forceps is performed in the same way with the push and push technique. The difference is the instrument used only ring forceps without the standard inserter. The insertion of IUD is performed by residents who are considered competence to perform the post-placental CuT-380A IUD insertion.

Data Analysis

We did the computerized randomization for the fifty sealed envelopes containing the CuT-380A distribution from Indonesia National Population and Family Planning Boards (BKKBN), sheets of informed consent, control cards, sheets of patient follow-up and insertion techniques. If there were subjects fulfilling the criteria, the operators took the envelope and performed the insertion technique in accordance with techniques which have been listed in the envelope and the operators filled out the study data sheet. In addition to requiring state of clean uterine cavity, we prescribed the uterine tonic contraction intramuscular injection of oxytocin after delivering the baby, metilergometrin maleate intavaginally, and also intramuscular or intravenous injection of oxytocin during or after delivering the placenta. It was to reduce the risk of expulsion of IUD. Furthermore, to ensure that uterine involution was maintained, we administered the metilergometrin maleate tablets (½-1 tablet three times a day for 1-2 weeks). After insertion, subjects were interviewed about their experience of pain during insertion. The operator recorded the insertion interval and birth outcomes in patient follow-up sheet. The subjects of the study were given a control card to be taken on the next follow-up period.

Patients went for control for the first follow-up (FU1) at 1st-2nd weeks, second follow-up (FU2) at 6th-8th weeks and third follow-up (FU3) at ≥ 12th weeks (3 months) after insertion. In each follow-up, a physical examination and an ultrasound were undergone to determine the IUD position and the distance of the IUD-ED, and also the adverse events related to the insertion technique. This study used intention to treat analysis. Follow-up following postpartum IUD insertion could be done clinically by ultrasonography (USG). Some studies stated that the ultrasound was better in follow-up the position of IUD than clinical examination. Evaluation of the IUD position was measured by assessing IUD-endometrium (IUD-ED) distance as gold standard.[18-21] Therefore, we analyzed the postpartum IUD insertion techniques with push and push and ring forceps technique.

The IUD-ED distance was conducted using abdominal ultrasonography. The malposition of IUD was when the IUD was not located in the middle of the uterine cavity (located in the lower segment of the uterus, cervix, rotated, the influx of part of the body or arms IUD into the myometrium) by ultrasonography. Insertion interval was the time between delivery of the placenta with the completion of IUD insertion in minutes. We did the bivariate analysis to determine the difference between the IUD-ED distance among both groups using Independent t-test and Mann-Whitney test. The significance was determined based on the value of $p < 0.05$. Malposition event and other side effects were reported. Overall data were analyzed using SPSS.

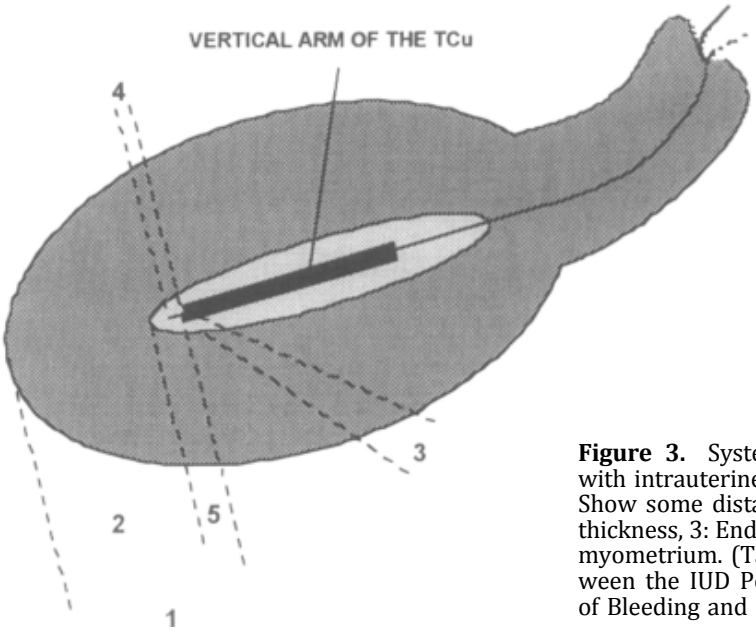

Figure 3. Systematic Overview of Uterine Sagital Sonography with intrauterine IUD.[22]
Show some distance proportions: 1: IUD-fundus, 2: Myometrium thickness, 3: Endometrium thickness, 4: IUD-endometrium, 5: IUD-myometrium. (Taken from: Faundes D et al. No Relationship Between the IUD Position Evaluated by Ultrasound and Complaints of Bleeding and Pain. Contraception. 1997; 56: 43-7)

RESULTS

Characteristics of the Subjects

Based on the clinical characteristics of the subjects (Table 1), there were no statistically significant differences in the characteristics of age, BMI, occupation, education, parity and gestational age between the two insertion techniques. The 20% subjects preferred to use postplacental IUD contraception during antenatal visit, while the rest chose to use in the hospital (at admission or during labor). The clinical characteristic variables showed significant differences between two insertion groups ($p<0.05$). The characteristic of clinical features and outcomes of labor were not statistically significant differences between the two insertion groups in terms of premature rupture of the membrane (PROM) incidence, vaginal delivery types and birth weight.

Table 1. Clinical Characteristics of the Subjects.

Characteristics	Ring forceps group		Push and push group		p
	Mean (SD); median (min-max)	n (%)	Mean (SD); median (min-max)	n (%)	
Age (years old)	27.0 (6.3); 27.o (16.0-36.0)		27.7 (5.9); 28.0 (15.0-39.0)		0.613[a]
BMI (kg/m^2)	26.7 (4.3); 25.7 (22,0-38,3)		25.0 (3.1); 24.6 (19.2-35.1)		0.107[a]
Occupation					
Housewife		19 (76.0)		13 (52.0)	
Labor		3 (12.0)		1 (4.0)	0.140[b]
Private employee		3 (12.0)		7 (28.0)	
Governm. employee		0 (0.0)		4 (16.0)	
Education					
Elementary		2 (80)		1 (4.0)	
Junior high school		5 (20.0)		4 (16.0)	0.742[b]
Senior high school		15 (60.0)		14 (56.0)	
University		3 (12.0)		6 (24.0)	
Parity					0.833[a]
0		13 (52.0)		11 (44.0)	
1		7 (28.0)		9 (36.0)	
> 1		5 (20.0)		5 (20.0)	
Gestational age	38.6 (1.5); 38.0 (37.-43.0)		39.0 (1.1); 39.0 (37.0-41.0)		0.193[a]
PROM					0.196[b]
No		16 (64.0)		21 (84.0)	
Yes:	7.5 (3.2); 8.0 (3.0-12.0)	9 (36.0)	5.5 (1.7); 5.0 (4.0-8.0)	4 (16.0)	0.260[c]
< 6 hours		2 (8.0)		3 (12.0)	
≥ 6 hours		7 (28.0)		1 (4.0)	
Choose IUD					
ANC		0 (0.0)		10 (40.0)	
Inpatient		9 (36.0)		2 (8.0)	0.002[b]
During labor		7 (28.0)		7 (28.0)	
Delivery		9 (36.0)		6 (24.0)	
Type of delivery					
Spontaneous		19 (76.0)		20 (80.0)	
Vaccum extraction		5 (20.0)		5 (20.0)	1.000[b]
Breech		1 (4.0)		0 (0,0)	
Birthweight (gr)	2,916.0 (409.7); 3,000.0 (2,100.0-3,600.0)		3,000.6 (363.5); 3,000.0 (2,300-3,600)		0.415[a]

a. Mann-Whitney test, b. Pearson chi-square test, c. Independent t-test

Insertion Procedure

In Table 2, we obtained an average insertion interval between ring forceps group (4.8 minutes) and push and push group (6.6 minutes). Insertion interval on all subjects in both study groups was within a maximum of 10 minutes after placental delivery. The ease of insertion mean score in ring forceps group was 7.5; while in push and push group was 6.7. The ease of insertion in both groups had a statistically significant difference ($p<0.05$) whereas the ring forceps technique was easier than push and push technique.

In the ring forceps insertion procedure technique, after touching the tip of fundus wall, we released the IUD; meanwhile, in the push and push insertion technique, the forceps was opened after touching uterine fundus, then the inserter tube and plunger rods together could still be pushed in again closer to the fundus. The mean length distance the entry of inserter in final push was 1.9 cm. The majority of subjects in both groups stated that they did not feel painful during the insertion procedure. Insertion pain in both groups was different, but it was not statistically significant ($p>0.05$).

Follow-up

Loss to follow-up

Of 25 subjects in the ring forceps group, at the first follow-up 23 (92.0%) subjects attended, at 2nd follow-up 22 (88.0%) subjects attended, and 21 (84.0%) subjects attended at 3rd follow-up. Meanwhile, in the push and push group, the subjects came to the first, second, and third follow-up were 24 (94.0%), 22 (88.0) and 20 (80%); respectively. Therefore, the overall percentages of loss to follow-up on were 6.0%, 12.0% and 18.0%; respectively for the first, second and third follow-up.

Expulsion and perforation

We did not find the expulsion and perforation incident.

IUD-Endometrium distance

The distance difference was not statistically significant ($p> 0.05$).

Table 2. Insertion Process Characteristics.

	Insertion techniques				p
	Ring forceps group		Push and push group		
	Mean (SD); median (min-max)	n (%)	Mean (SD); median (min-max)	n (%)	
Insertion interval (minutes)	4.8 (1.5); 5.0 (3.0-10.0)		6.6 (1.7); 7.0 (3.0-10.0)		<0.001[a]
Easiness (1-10)	7.5 (0.7); 8.0 (6.0-9.0)		6.7 (0.7); 7.0 (5.0-8.0)		<0.001[a]
Length distance the entry of inserter in final push (cm)	-		1.9 (0.6); 2.0 (1.0-3.0)		
Insertion pain					
Not feel		5 (20.0)		4 (16.0)	
Feel but not pain		14 (56.0)		17 (68.0)	0.670[b]
Uncomfortable		5 (20.0)		3 (12.0)	
Pain		1 (4.0)		1 (4.0)	

a. Mann-Whitney test, b. Pearson chi-square test

Table 3. IUD-Endometrium (IUD-ED) Distance.

IUD-ED (mm)	Insertion techniques		p
	Ring forceps	Push and push	
	Mean (SD); median (min-max)	Mean (SD); median (min-max)	
1st Follow-up (FU1)	4.9 (3.4); 5.8 (0.0-13.0)	4.1 (2.2); 4.2 (0.0-8.1)	0.208[a]
2nd Follow-up (FU2)	3.2 (2.3); 3.7 (0.0-7.0)	2.6 (1.8); 2.5 (0.0-6.6)	0.452[b]
3rd Follow-up (FU3)	1.0 (0.9); 1.2 (0.0-2.7)	0.9 (0.8); 1.1 (0.0-2.7)	0.427[a]

a. Mann-Whitney test, b. Independet t-test

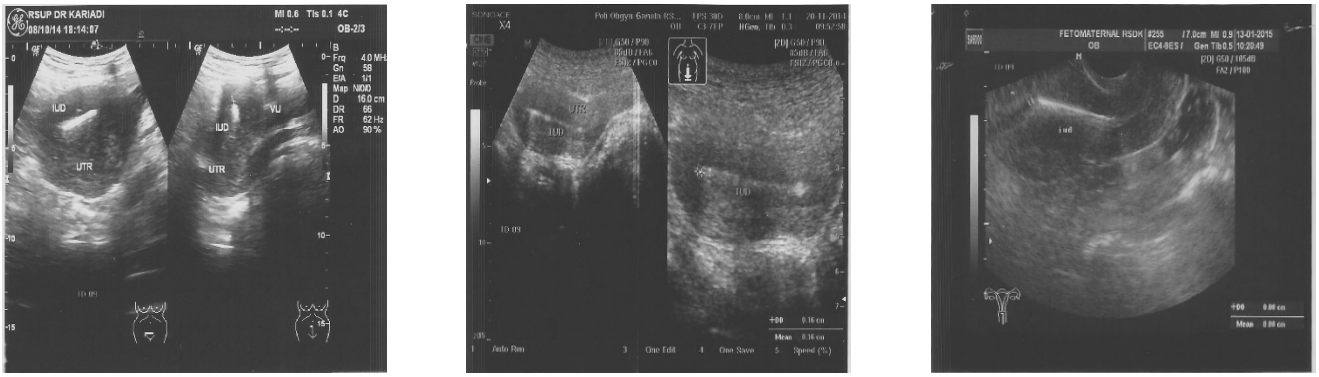

Figure 4. Abdominal USG Appearance in a Patient of Push and Push Technique Group at the First Follow-up in Rotation, However, at the Second and Third Follow-up, the IUD Position was Back to Normal.

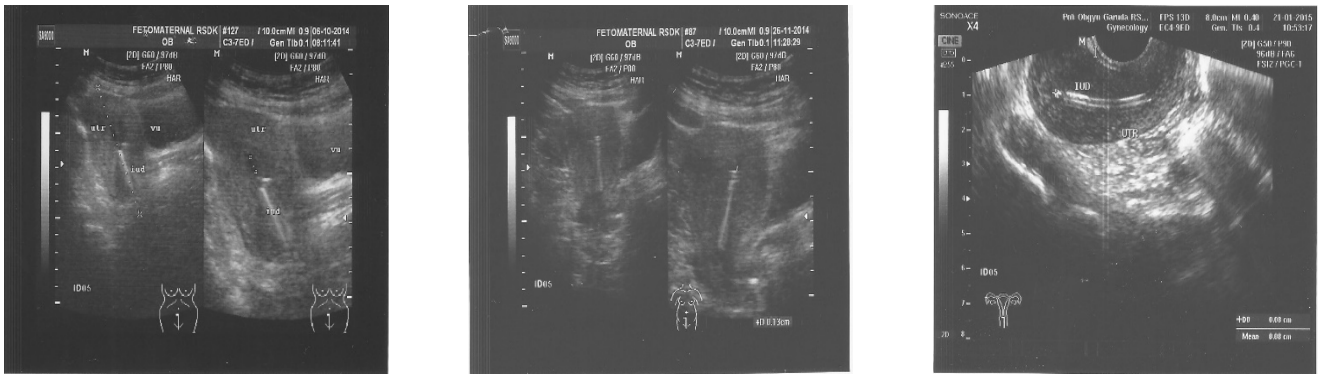

Figure 5. Abdominal USG Appearance in a Patient of Ring Forcepss Group at the First Follow-up, IUD was Located Close to the Opening of Internal Ostium of Uterine Cervix; However, at the Second and Third Follow-up, The IUD Position was Back to Normal.

Malposition occurrence happened in each insertion groups on the first follow-up. In the group of push and push technique, malposition occurred in a rotation of intrauterine IUD position, so that it was not placed in midsagital of the uterus (Figure 4); while in the ring forceps insertion group, malposition occured at the position of the IUD in the lower uterine segment approach internal ostium of uterine cervix (Figure 5). At the second and third follow-up, we did not find the malposition.

At three months follow-up in both insertion groups technique, we did not get the incidence of expulsion, perforation or pregnancy. There were two subjects in the ring forceps insertion group and one in the push and push insertion group who asked to remove the IUD at the third follow-up. There-fore, the continuation rate for three months of follow-up in the ring forceps insertion group was 90.4% and 95% for the push and push insertion group.

DISCUSSION

Global reference manual in Postpartum Intrauterine Contraceptive Device (PPIUD) stated that IUD insertion required three instruments consisting of a vagina speculum, a ring forceps and a long placental forceps (Kelly placenta forceps, 12 inches in length). Vaginal speculum was for visualizing the cervix by depressing the posterior wall of the vagina, ring forceps was for grasping the anterior lips of the cervix and placental forceps was to grasp IUD and for the IUD insertion to the uterine cavity.[23]

Two techniques in this study had implemented a new inovation of IUD insertion through only one instrument (ring forceps). The vaginal speculum and ring forceps function was replaced by the middle and fore fingers in a supine position. The placenta forceps for clamping and inserting the IUD was replaced by ring forceps. The benefit of the tube inserter and plunger rod on push and push

technique was that the IUD could be placed as close as possible to the endometrium of uterine fundus. Therefore, this application could be performed for postpartum contraceptive services which did not require the placenta forceps and gynecology bed.

Two retrospective cohort studies about postplacental IUD using in Dr. Kariadi Hospital in 2013 showed that the typical use rate was 0.2%, the continuity rate was 92.3%, the expulsion rate was 1.4% and no perforation reported. Accordance with the study, in 2014, the typical use, continuity, expulsion rate were 0%, 98.1% and 0.8%, respectively. They did not find the perforation occurrence.[24,25] Our study was a double-blinded randomized controlled trial where the patient and examiner of ultrasound did not know the IUD insertion procedure that had been used thereby reducing the bias after procedure due to restriction of activity in both groups. Selection bias could be anticipated through random allocation using randomization techniques using computers. Bias that might arise in the variable characteristics of the study subjects such as age, BMI, parity, gestational age at birth, early rupture of amniotic membrane, occupation and education, and the type of labor. All of the bias could be excluded by looking to the statistic where there were no differences in both treatment groups.

Counseling for using contraception postpartum must be integrated during antenatal visits. In our study, the majority of subjects received the counseling while in the hospital, but the continuity rate was still high. Study by Xu et al about 3 months follow-up postplacental IUD insertion, the continuation rate was 87.7%.[16,26,27]

Our study revealed that push and push insertion technique required a longer time than the ring forceps technique. This was because the technique of push and push needed preparatory stages starting from entering IUD string, vertical stem and the plunger rod into the inserter tube, also using ring forceps to grasp the inserter tube. However, push and push technique had advantages in terms of more able to put the IUD as close as possible to the endometrial uterine fundus. The distance of IUD-ED at 6 weeks of follow-up was 10 mm. A distance of more than 10 mm could be at risk of spontaneous expulsion, but it was easier to be lifted.[28,29] Other studies mentioned that the IUD-ED distance of 7 mm was the maximum distance which was safe in relation to the incidence of side effects of pain and bleeding. Our analysis obtained the differences of IUD-ED distance in both treatment groups; however it was not statistically significant. Our study found the average distance of the IUD-ED on the ring forceps and push and push group in three periods of follow-up was less than 7 mm, which meant that both techniques had low risk of side effects of pain, bleeding and spontaneous expulsion.[22] The IUD-ED distance in both insertion technique would be reduced as the involution of the uterus without the occurrence of spontaneous expulsion at 12-week follow-up. The mean distance of IUD-ED in both insertion techniques was not significant difference, but the maximum IUD-ED distance at 1-2-week and 6-8-week post insertion was shorter in push and push insertion technique group. These results proved that the technique of push and push by using a combination ring forceps and standard inserter, the IUD could be pushed closer to the fundus after the ring forceps being removed.[17]

Retrospective cohort study in our hospital in 2013, IUD-ED distance in each follow-up period among 1,555 women at < 6 weeks was 6.2 mm, among 1,209 women at 6 wks-<3 months was 5.8 mm and among 928 women at 3-<6 months was 5.6 mm.[25] In this study, we did not find the expulsion incident (Table 4).

Multicenter comparative trial study in China comparing hand insertion (470 subjects) with ring forceps insertion (440 subjects) of CuT-380A IUD found the six-month expulsion rates per 100 women were 13.3 for hand insertion and 12.7 for instrument insertion.[16] Cohort study by Eroglu, et al in 2006, among 82 women who had obtained IPPI, the rate of expulsion at 8-week post insertion was 22 events (25.8%) consisting of 13 (15.8%) of partial expulsion and 9 (10.0%) of complete expulsion. At 6-month post insertion from 61 women, they obtained 4 (6.5%) expulsion, 1 (1.6%) partial expulsion and 3 (4.9%) complete expulsion.[30] A prospective randomized control trial by El Betalgy, et al, compared the early (within 48 h) insertion in normally delivered women between the CuT-380 IUD (150 subjects) and Multiload 375 IUD (375 subjects) using Kelly's forceps. The expulsion rates were relatively high for both IUD; 15.0% in CuT-380 compared to 14.9% in Multiload 375 insertion. In CuT 380 IUD group, at 6-week follow-up, there was 5/143 (3.4%) IUD expulsion and at 6 months, there was 8/125 (6.0%) expulsion.[29] Meanwhile, a cohort study in Dr. Kariadi Hospital using insertion

technique of push and push, there was no expulsion at 1-2 week post insertion. The incidence of expulsion were 2 (1.9%) and 2 (1.9%) at 3- and 6-month follow-up, respectively. At 12-month follow-up they found 3 of 102 subjects (2.9%) experiencing expulsion.[17] In 2013 from the same hospital which covered 609 subjects, the expulsion rate was 1.4%. In 2014 with the number of subjects 305, the expulsion rate of was 0.8%. Dr. Kariadi Hospital is a referral and teaching hospital so that the postpartum family planning services will be undergone by the residents who are learning to gain the competence in IUD insertion post placental.[24,25]

Malposition in postplacental insertion occured because the large capacity of the uterus and cervix opening width at the time of insertion and the residual the blood clot at the early puerperium.[19] Malposition was not associated with postpartum insertion.[31,32] In our study, malposition happened in one subject of each treatment group in 1-2 week follow-up, but in 6-8-week and >3-month follow-up, the IUD already changed to the normal position due to the involution of the uterus and miometrium contraction.[33,34]

The weakness of this study was the ultrasound follow-up of each subject was performed by a single examiner only. Apart from that, the follow-up of the subjects should be conducted by inter-class correlation method. However, the subjectivity of the follow-up results of ultrasound in measuring IUD-ED distance could be reduced because the ultrasound examiner did not know the type of IUD insertion technique used. The loss to follow-up at the first, second, and third follow-up were 6.0%, 12.0% and 18.0%. We had anticipated this events by adding 20% of the minimum number of samples.

CONCLUSION

There are differences in the IUD-ED distance between the CuT-380A IUD insertion postplacental vaginal delivery using the technique of push and push and ring forceps technique; however it is not statistically significant. Clinically, in push and push insertion group, IUD-ED distance tend to be shorter. Push and push IUD insertion technique can continue its use for producing IUD-ED distance which is likely to be closer to the endometrium uterine fundus.

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Table 4. Expulsion Rate of Postplacental IUD User in Each Follow-up Period.

Follow-up period	< 6 weeks	6 wks - < 3 mo.	3 mo. - < 6 mo.	6 mo. - < 9 mo.	9 mo. - < 12 mo.	12 mo. - < 24 mo.
Number of IUD user	2,231	2,066	1,713	1,397	1,188	745
Expulsion event	6	27	23	5	3	4
Expulsion rate	0.3%	1.2%	1.3%	0.4%	0.3%	0.8%

Source: Research paper in 24th Annual Scientific Meeting Indonesian Society of Obstetrics and Gynecology 2014.[24]

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