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Original Research Article

Ultrasound guided detection of position of post partum intra uterine contraceptive device and its relation to complications

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ABSTRACT

Background: Worldwide, Intrauterine Contraceptive Device (IUCD) is one of the most commonly used reversible methods of contraception among married women of reproductive age. It is the second most commonly used forms of contraception, ranking second only to female sterilization. Proper positioning of Copper containing IUCD is of utmost importance for efficacy and safety. The immediate postpartum period, after a birth but prior to discharge from the hospital is an important but under utilized time frame to initiate contraceptives, specially long acting contraceptives such as intrauterine contraceptive device (IUCD). To study the location of Copper IUCD by ultrasound, relationship between position and complaints, failure rate and expulsion rate in post-partum IUCD cases.
Methods: The study was prospective, analytical study conducted on 200 women for one year. IUCD insertion was done in two groups; group A (normal delivery, postplacental) and group B (caesarean section, intracaesarean). On ultrasonography, position and distance of IUCD from fundus of uterus was measured. Outcome measures were expulsion, complication and failure rate upto six months. Informed consent was taken from each participant and ethical justification for the study was sought.
Results: Majority of the patients were in age group of 21-25 years. Multigravidae patients had more acceptability of IUCD than primigravidae. More than half of IUCD insertion was done by senior residents (56%). Malpositions were more common in vaginal delivery (62%) than caesarean section (28%). Most common malposition was mid cavity and least common was oblique. Most common complaint was pain abdomen and least common was expulsion.
Conclusions: Sonography can be used as an adjunct to clinical examination to examine the position of the IUCD. Ultrasonography done after PPIUCD insertion helps in determining, whether PPIUCDs are placed in normal position or malposition. Malpositioned PPIUCDs have more complications as compared to normally placed IUCDs.

Keywords: Intra uterine contraceptive device, Location, Malposition, Post Partum, Ultrasound

INTRODUCTION

Approximately, 61% of births in India occur at intervals shorter than the recommended birth to birth interval of approximately 36 months.[1] 78% of conceptions in India each year are unplanned and 25% are unwanted.[2]

Currently, 68% women are using contraception in developed world and 55% in developing world. This explains why India accounts for more than 20% of global maternal and child death.[3]

Worldwide, Intrauterine Contraceptive Device (IUCD) is one of the most commonly used reversible methods of contraception among married women of reproductive age. It is the second most commonly used forms of contraception, ranking second only to female sterilization.[4]

IUCD is a safe, cost effective, reliable and reversible method of contraception (both emergency as well as preventive) with pearl index of 0.8, having cumulative pregnancy rate less than 1 per 100 women within the first year of use.[5] It is preferably inserted during or just after menstruation, and within 10 min of delivery (post placental), <48hrs, >6weeks (postpartum) or intracaesarean.[6] IUCD insertion immediately after delivery is appealing since women is confirmed not to be pregnant, her motivation for contraception is high, and the setting is convenient since the procedure is carried out by expert hands and women remains under professional care post delivery.

Proper positioning of Copper containing IUCD is of utmost importance for efficacy and safety. Moreover, follow-up after 6 weeks is recommended since first month is the period with highest risk of downward migration and expulsion.[7]

On the basis of position and distance measured from fundus by USG the normal position of Cu IUCD is defined as Cu IUCD placed linearly in the midline in the uterine cavity with the distance from fundus measured within 15 mm[8] or less. Since not many studies have been done on positioning of Cu IUCD by USG and its relationship with complication like pain, bleeding and failure. Hence this study was conducted to study the relation of proper positioning of Cu IUCD in the uterine cavity as determined by USG, with complications like pain, bleeding and failure rate. Objectives of present study were:

- To study the location of Cu T380A (IUCD) by USG in PPIUCD cases.
- To study the relationship between the IUCD position evaluated by USG and complain of bleeding and pain.
- To study the failure rate and the expulsion rate of PPIUCD in terms of different position of Cu IUCD.
- To study correlation between experience of the provider and positioning of Cu T380A (IUCD).

METHODS

The present study was a prospective, analytical study conducted on 200 women attending Obstetrics and Gynaecology Department at BSA Medical College and hospital, New Delhi. They were divided into two groups of 100 each.

In Group A (n=100) IUCD was inserted after normal vaginal delivery (Postplacental insertion). In Group B (n=100) IUCD was inserted during caesarean section (Intracesarean). Study was carried out from January 2015 to January 2016.

All pregnant women who were willing for PPIUCD and having no contraindication for IUCD as per WHO (Medical Eligibility Criteria I and II) were included in study. Exclusion criteria were refusal by patient, Chorioamnionitis, Puerperal Sepsis, PPH, Premature rupture of membrane >18hours. Study was done after obtaining ethical clearance from ethical committee.

Post placental insertion

IUCD placed after delivery of placenta in normal vaginal delivery within 10 minutes

Intra cesarean insertion

After delivery of placenta IUCD placement was done into endometrial cavity through the uterine incision.

Ultrasonography

Ultrasonographic examination was done on day 3, of normal delivery or cesaerean section.

Following points were noted on ultrasonography

- Position of IUCD-a. Normal, b. Malposition
- Distance from fundus. Distance was measured from fundus to midpoint of horizontal limb of Cu T380A, excluding myometrial thickness.

On the basis of position and distance measured from fundus by USG, the normal position of IUCD is defined as IUCD placed linearly in midline in the uterine cavity with distance from fundus measured 15 mm or less.

Types of Malposition

- Mid cavity placement- Cu IUCD placed linearly in middle in the uterine cavity with distance from fundus >15 mm.
- Lateralised placement- Fundally placed upright Cu IUCD with appropriate distance from fundus, not in middle.
- Lower segment placement- Linearly placed Cu IUCD lying visibly in the lower segment of uterine cavity.
- Oblique or Inverted placement- Cu IUCD lying anywhere in the uterine cavity which are visibly oblique or inverted placed.

Follow up visits were done at 6 weeks and 6 months and women were evaluated for:

- Expulsion: by history, examination or USG.
- Side effects: bleeding, pain, discharge per vaginum.
- Women asked to report back in case of missing thread or missed period.

Outcomes

- Present study analyzed the following:
- Expulsion rates-up to 6 months,

- Complication rates-up to 6 months,
- Failure rate-up to 6 months

Statistical analysis

Data was entered in Microsoft excel spreadsheet and analysed by SPSS Statistical software version 17.0. Qualitative data were presented as percentages and proportions. Quantitative data was presented as mean and standard deviation. Chi square test was employed for significance of association. For statistical significance, a value of <0.05 was considered.

RESULTS

Age

Majority of the patients belong to 21-25 years of age group. Least common age group was less than 20 years. The mean age of patients with PPIUCD insertion was 24.81±3.14 yrs.

Religion

Both the groups constituted heterogenous population with more acceptability in Hindu (84%) as compared to Muslims (16%).

Table 1: Parity in study population.

	Frequency	Percentage
Multi	132	66.00
Primi	68	34.00
Total	200	100.00

Among both the groups multigravidae patients (66%) had more acceptance of IUCD than primigravidae (34%) (Table 1).

Table 2: Location by ultrasonography.

	Frequency	Percentage
Correctly placed or normal	110	55.00
Lateral	13	6.50
Lower segment	11	5.50
Mid cavity	62	31.00
Oblique	4	2.00
Total	200	100.00

Table 2 shows that in 55% cases had normally placed IUCD whereas in 31% cases, it was in mid cavity. Lateral and lower segment malposition was almost prevalent (Table 2).

Table 3: IUCD's insertion by various experts.

	Frequency	Percentage
Consultant	14	7.00
DNB residents	74	37.00
Senior residents	112	56.00
Total	200	100.00

Table 3 shows that more than half of the IUCD insertion was done by Senior residents (56%) whereas more than one third of the IUCD insertion was done by DNB residents (37%). Only 7% of PPIUCD was done by consultants.

Vaginal versus caesarean groups

Study reveals that malposition was much more in vaginal delivery group (62%), as compared to 28% in LSCS group. In both LSCS and vaginal delivery group, most common malposition was mid cavity, 18(64.29%) in LSCS groups and 44(70.97%) in vaginal delivery groups.

Table 4: Effect of expertise and positioning of IUCD.

Malposition	Insertion done by			Total	P value
	Consultant	DNB Resident	Senior Resident		
Lateral	3 (23.08%)	2 (15.38%)	8 (61.54%)	13 (100%)	<0.001
Lower segment	0 (0.00%)	11 (100%)	0 (0.00%)	11 (100%)	
Mid cavity	0 (0.00%)	37 (59.68%)	25 (40.32%)	62 (100%)	
Oblique	0 (0.00%)	4 (100%)	0 (0.00%)	4 (100%)	
Total	3 (3.33%)	54 (60.00%)	33 (36.67%)	90 (100%)	

In both groups least common was oblique, 1(3.57%) case in LSCS groups and 3(4.84%) cases in vaginal delivery groups. This finding was statistically non-significant. Among all the 4 malposition, order was Consultant <Senior residents <DNB residents, except in lateral malposition order was changed, DNB<Consultants<Senior resident. P value was significant (<0.0001) (Table 4).

Table 5 shows that out of 110 cases of normally placed IUCD cases, 58 (52.72%) had complain at 6 weeks follow up.

The most common complain among normally placed IUCD cases was pain abdomen (50%) and least common complaint was expulsion (1.72%). Among all the 90 malpositioned IUCD cases, 62 cases (68.88%) had complaint at 6 weeks.

Table 5: Complains at 6 weeks follow up.

Location by USG	Complains at 6 weeks					Total	P value
	BPV	Discharge PV	Expelled	Missing thread	Pain abdomen		
Normal	19 (32.76%)	4 (6.90%)	1 (1.72%)	5 (8.62%)	29 (50.00%)	58 (100%)	<0.001
Lateral	3 (42.86%)	0 (0.00%)	0 (0.00%)	1 (14.29%)	3 (42.86%)	7 (100%)	
Lower segment	1 (10%)	0 (0.00%)	9 (90.00%)	0 (0.00%)	0 (0.00%)	10 (100%)	
Mid cavity	19 (45.24%)	3 (7.14%)	4 (9.52%)	2 (4.76%)	14 (33.33%)	42 (100%)	
Oblique	1 (33.33%)	0 (0.00%)	2 (66.67%)	0 (0.00%)	0 (0.00%)	3 (100%)	
Total	43 (35.83%)	7 (5.83%)	16 (13.33%)	8 (6.67%)	46 (38.33%)	120 (100%)	

Table 6: Complaints at 6 months follow up.

Location by USG	Complains at 6 months follow up					Total	P value
	BPV	Discharge PV	Excess BPV	Missing thread	Pain abdomen		
Normal	1 (33.33%)	0 (0.00%)	1 (33.33%)	0 (0.00%)	1 (33.33%)	3 (100%)	0.672
Mid cavity	2 (16.67%)	4 (33.33%)	2 (16.67%)	2 (16.67%)	2 (16.67%)	12 (100%)	
Oblique/ lateral	0 (0.00%)	0 (0.00%)	1 (100.00%)	0 (0.00%)	0 (0.00%)	1 (100%)	
Total	3 (18.75%)	4 (25.00%)	4 (25.00%)	2 (12.50%)	3 (18.75%)	16 (100%)	

In the above study lateral and lower segment malposition were not taken in study because in lower segment position out of 11 cases, 9 PPIUCD were found expelled at 6 weeks, and 2 PPIUCD was removed at 6 weeks, 1 because of excessive bleeding per vaginum and 1 because of failure and in all 13 cases of lateral malposition, there was no complain at 6 months of follow up.

Table 7: Expulsion at 6 weeks.

Location by USG	Expulsion at 6 weeks		Total	P value
	No	Yes		
Normal	101 (99.02%)	1 (0.98%)	102 (100%)	<0.001
Lateral	12 (100%)	0 (0.00%)	12 (100%)	
Lower segment	2 (18.18%)	9 (81.82%)	11 (100%)	
Mid cavity	55 (93.22%)	4 (6.78%)	59 (100%)	
Oblique	2 (50.00%)	2 (50.00%)	4 (100%)	
Total	172 (91.49%)	16 (8.51%)	188 (100%)	

All the complications were found to be much less at 6 months in both the normally placed and malpositioned cases. But these complications were significantly less in normally placed PPIUCD cases (3) as compared to malpositioned PPIUCD cases (13) (Table 6).

Table 8: Expulsion at 6 months.

Location by USG	Expulsion at 6 months		Total	P value
	No	Yes		
Normal	2 (2.08%)	94 (97.92%)	96 (100%)	<0.001
Lateral	0 (0.00%)	11 (100.00%)	11 (100%)	
Mid cavity	8 (16.67%)	40 (83.33%)	48 (100%)	
Oblique	1 (100%)	0 (0.00%)	1 (100%)	
Total	11 (7.05%)	145 (92.95%)	156 (100%)	

All the expulsions were found within 6 weeks of insertion. Out of all the expulsion seen, maximum expulsion was seen in lower segment malposition (81.82%) followed by oblique malposition (50%), mid cavity malposition (6.78%) and by normal position (0.98%) (Table 7).

No malposition was found in lateral malposition. All the expulsion found was in vaginal delivery group of PPIUCD insertion. No expulsion was found at 6 months of follow up study (Table 8).

Table 9: Continuation at 6 weeks.

Location by USG	Continuation at 6wks		Total	P value
	No	Yes		
Normal	5 (4.90%)	97 (95.10%)	102 (100%)	<0.0001
Lateral	1 (8.33%)	11 (91.67%)	12 (100%)	
Lower segment	11 (100%)	0 (0.00%)	11 (100%)	
Mid cavity	10 (16.95%)	49 (83.05%)	59 (100%)	
Oblique	3 (75%)	1 (25%)	4 (100%)	
Total	30 (15.96%)	158 (84.04%)	188 (100%)	

Table 9 shows that continuation rate was significantly more in normally placed PPIUCDs as compared to malpositioned PPIUCD cases. Among all the malpositions continuation rate was maximum in lateral type (91.67%) and minimum in lower segment type (0%). Table 10 shows that at 6 months of follow up removal was much more in malpositioned group (11%) as compared to normally placed PPIUCD groups (25%). Among all the malpositioned groups, maximum expulsion was seen in midcavity and minimum expulsion was seen in lower segment group.

Table 10: Removal at 6 months.

Location by USG	Removed at 6 months		Total	P value
	No	Yes		
Lateral	6 (7.14%)	2 (5.56%)	8 (6.67%)	0.056
Lower segment	7 (8.33%)	1 (2.78%)	8 (6.67%)	
Mid cavity	32 (38.10%)	20 (55.56%)	52 (43.33%)	
Oblique	0 (0.00%)	2 (5.56%)	2 (1.67%)	
Normal	39 (46.43%)	11 (30.56%)	50 (41.67%)	
Total	84 (100.00%)	36 (100%)	120 (100%)	

DISCUSSION

Postpartum period is potentially an ideal time to begin contraception as women are more strongly motivated to do so at this time, which also has the advantage of being convenient for both women and health care providers. PPIUCD insertion is a very effective LARC (Long Acting Reversible Contraceptive) method. It is known that it has very high efficacy and good safety profile, but at the same time efficacy, safety and complications, all depends on whether it is properly inserted in normal position or not. Position can accurately be determined only by various types of radiological evaluation.

The age of distribution in this study for PPIUCD insertion was 21-25 yrs, with mean age of 24.81 yrs which was comparable to population studies by Xu et al (24.55±3.1 yrs), Celen et al (24.7 yrs).[9,10] The age composition depends upon age at marriage, parity of the women in chosen population.

In total 200 subjects, insertion of PPIUCD was in primipara (34%) and in multipara (66%). PPIUCD insertion was more accepted by multipara, similar to the study done by Grimes et al where they found higher acceptance in multiparous women.[11] Insertion of PPIUCD was more acceptable to the patients belonging to hindu religion (84%) as compared to muslim religion (16%), possibly due to hindu predominance in the catchment area of hospital.

On ultrasonographic evaluation done on day 3 following PPIUCD insertion, among both groups, PPIUCD was found to be in normal position in 110 (55%) cases and malposition was found in 90 (45%) cases. Among all the malposition, most common malposition was midcavity 62 (31%) cases and least common malposition was oblique 4 (2%). This study finding are comparable to the previous studies done by Gupta et al in 2014 having normally placed PPIUCD in 56% and malposition in 44% cases.[12]

In total 200 subjects, PPIUCD insertion was done by consultants in 14 cases (7%), by DNB residents in 74 cases (37%) and by senior residents in 112 cases (56%).

In total 200 subjects, rate of malposition was found significantly more in vaginal delivery group 62% as compared to 28% in LSCS group. In both LSCS and vaginal delivery group, most common malposition was mid cavity, 18 (64.29%) in LSCS groups and 44(70.97%) in vaginal delivery groups. In both groups least common was oblique,1(3.57%) cases in LSCS groups and 3(4.84%) cases in vaginal delivery groups. These findings are comparable to previous study done by Swati et al which shows malposition in vaginal delivery group (68.2%) and in LSCS group (31.8%).[12]

Data on comparison of effect of expertise on malpositioning shows that among all the 4 malpositions the order was consultants<senior resident<DNB resident but in lateral type of malposition this order is changed making p value significant because total number of PPIUCD insertion done by consultants were less and all the malpositon was of lateral type. Previous studies reveal that among all the malpositon, lateral position was best having minimal or less complications and effective as like normally placed PPIUCD. No study has been done on comparison between effect of expertise and various types of malpositions.

At 6 weeks of follow up study reveals that out of 110 cases of normally placed IUCD cases, 58 cases (52.72%) had complains at 6 weeks follow up. The most common complain among normally placed IUCD cases was pain abdomen (50%) and least common complaint was expulsion (1.72%). Among all the 90 malpositioned IUCD cases 62 cases (68.88%) had complain at 6 weeks. Among all the malposition; mid cavity was most common, having most common complain bleeding per vaginum (45.24%) and least common was missing thread. In lateral position, most common complaint was bleeding per vaginum and pain abdomen and least common was expulsion (0%) and missing threads. In lower segment and oblique malposition, most common complaint was expulsion followed by bleeding per vaginum. This study shows variations from previous studies where most common complaint was bleeding per vaginum (27.71%) followed by pain abdomen (20.65%). It was probably because most of the subjects included in our study was illiterate or having less education so they cannot appreciate difference between normal physiological changes of puerperium and complications due to PPIUCD malposition.

On follow up at 6 months, Lateral and lower segment malposition were not taken in study because in lower segment position, out of 11 cases, 9 PPIUCD was found expelled at 6 weeks, and 2 PPIUCD was removed at 6 weeks,1 because of excessive bleeding per vaginum and 1 because of failure. And in all 13 cases of lateral position, there was no complain at 6 months of follow up. All the complications were found to be much less at 6 months in both the normally placed and malpositioned cases. But these complications were significantly less in normally placed PPIUCD cases (3%) as compared to malpositioned PPIUCD cases (13%). At 6 months of follow up all the complications was much less as compared to 6 weeks of follow up, because all the physiological changes have subsided at this time, making study comparable to previous studies. P value was not significant.

Expulsion rates at 6 weeks-All the expulsions were found within 6 weeks of insertion. No malposition was found in lateral malposition. All the expulsion found was in vaginal delivery group of PPIUCD insertion. One thing different from previous studies was that out of all the malpositions, maximum expulsion was seen in oblique position (50%) followed by lower segment (42.8%), which is reverse in our study. It could be possibly because of less no of oblique position found (4 cases), out of which 2 were expelled and out of other 2 and one case could not be followed up. P value was found significant same as previous studies. Expulsion rate at 6 months-not even a single expulsion was found at 6 months of follow up, which was same as previous studies.

This study revealed that continuation rate was significantly more in normally placed PPIUCDs as compared to malpositioned PPIUCD cases. Among all the malpositions continuation rate was maximum in lateral type (91.67%) and minimum in lower segment type (0%). So, more study needs to be done in near future regarding this parameter.

Among all the malpositioned PPIUCD cases, maximum continuation rate was in lateral position and minimum continuation was in oblique position. Not even a single case of PPIUCD was continued in lower segment position after 6 weeks that is why lower segment position was not taken in study at 6 months follow up period. P value was statistically significant (<0.001), because among all the malposition, lateral position was continued in 100% cases at 6 months follow up which was even more than normally placed PPIUCD (97%). It is possibly because number of laterally placed PPIUCD was much less (11) as compared to normally placed PPIUCD (97) in present study making p value significant.

This study revealed that removal at 6 weeks was more in malpositioned group (31%) as compared to normally placed PPIUCD groups (22%). Maximum removal was in midcavity group (45.28%), minimum in lower segment group. In normally placed IUCD, removal was done because of willingness for tubal ligation in normal delivery groups and missing threads in intracesarean groups making patients anxious, despite proper counselling. P value was not significant (0.961).

Study reveals that follow up removal at 6 months was much more in malpositioned group (11%) as compared to normally placed PPIUCD groups (25%). Among all the malpositioned groups, maximum removal was seen in midcavity and minimum removal was seen in lower segment group. Removal at 6 months was much less as compared to removal at 6 weeks among all malpositions because removal at 6 weeks was mostly due to complications, but at 6 months it was because of willingness for tubal ligation or conception.

No cases of perforation were found. Two cases of failure were found. This is in accordance with literature which shows failure rate of PPIUCD less than 1%.

Statistically significant association was found with the side effects like expulsion, menstrual irregularity and pain and the position of the IUCD in the cavity which has also been shown by the previous studies.

The number of correct placements could be used as an indicator of personnel training. Regular training of the personnel audit may help in reducing the number of malpositions reduce the complication rate and thus increase the acceptance of the IUCD.

CONCLUSION

The clinical examination has its limitation in the assessment of the IUCD position especially in postpartum IUCDs as the threads remain coiled inside the uterus in

postpartum state. Thus, sonography can be used as an adjunct to clinical examination to examine the position of the IUCD. Ultrasonography done after PPIUCD insertion helps in determining, whether PPIUCDs are placed in normal position or malposition. Malpositioned PPIUCDs have more complications as compared to normally placed IUCDs. Also, incorrectly placed PPIUCDs have more expulsion rate and more failure rate. Among all the malposition mentioned, lower segment malposition has maximum expulsion rate, so in that case removal and reinsertion can be offered if identified on ultrasonography. Alternately these patients could be closely followed up for early detection and prompt management of any complication. Lateral type of malposition has minimum complications and no expulsion rate, thus we conclude that PPIUCDs found to be lateralised placed on ultrasonography are of least concern to the patient and the caregiver. On the other hand, inverted or obliquely placed PPIUCDs were associated with maximum side effects and failure, so it should be followed up stringently.

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