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Intrauterine Location and Expulsion of Intrauterine Device

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ABSTRACT

Objective To evaluate the misplacement of the IUD in uterine cavity at immediate post insertion, the downward displacement at 6th and 12th week after insertion by transvaginal ultrasound and the expulsion rate at 12th week.

Design Prospective descriptive study.

Setting Family Planning Unit, Department of Obstetrics and Gynaecology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University.

Materials and Methods A total of 110 women who had Tcu 380 A IUD inserted from May, 2001 to December, 2001 were recruited. Prior to IUD insertion, history taking, bimanual pelvic examination and uterine length measurement with uterine sound were performed. A transvaginal ultrasound scan was performed immediately after insertion to measure the distance from the superior edge of the IUD to the internal uterine wall (D). History taking, pelvic exam and transvaginal ultrasound were repeated at 6th and 12th week. The IUD that protruded visibly through the external cervical os or lay completely in the cervical canal were removed and the women were offered the option of a re-insertion or other contraceptive methods.

Results Misplaced IUD ($D \geq 3$ mm.) were identified in 59 of 110 women (53.6%). The median distance between the superior edge of the IUD to the internal uterine wall was 3.00 mm.(range 0.2-30.0 mm.). Four cases had expulsion of IUD and the distance "D" were 1.3, 3.1, 25, and 30 mm. The cumulative expulsion rate at 12th week was 2.67%. The cumulative downward displacement (≥ 5 mm.) rate were 3.31% at 6th week and 4.02% at 12th week.

Conclusion The distance between the internal uterine wall and the superior edge of the IUD at immediate post insertion and downward displacement may have influence on IUD expulsion.

Key words: Misplacement, Downward displacement, Expulsion, Transvaginal ultrasound

The voluntary control of fertility is very important in developing countries. The intrauterine devices (IUDs) are long term contraception with high effectiveness.[1-4] However, the expulsion is one of the important reasons for discontinuation of IUD use. Young age, amount of menstrual flow and dysmenorrhea have been described as the predictors of IUD expulsion.[5] The proper placement

of the IUD in the uterine fundus also plays an important role in IUDs expulsion.[6] Cervical canal localization of the IUD was correlated with much higher pregnancy rates.[6] Intrauterine displacement of the IUD usually occurs in the first 4 months of use and thereafter a rather stable position is observed.[7] Report from previous studies, the cumulative expulsion rate were 2.2% at the first 3 months and 3.1% at 12 months.[8] Modern ultrasound techniques employing real-time devices are especially well suited for the detection of IUD in the uterus. The removal of IUD determined by ultrasound examination to be misplaced significantly decreased expulsion rate.[6]

In Thailand, women who had IUD inserted would be estimated the position of the inserted IUD by strings that protrude visibly through the cervical canal. Generally, it is difficult to assess the intracavity location of the IUD by clinical examination. The objective of this study is to evaluate the location of the IUD in uterine cavity immediate post insertion and follow up visit at 6th week and 12th week after insertion by transvaginal ultrasound. Correlation between the rate of IUD expulsion at 12th week with associating factors, such as characteristic of women who use Tcu 380A IUD, misplacement and downward displacement was determined.

Materials and Methods

After approved by Committee on Human Rights Related to Researches Involving Human Subjects, a total of 110 women who had Tcu 380 A IUD inserted at the family planning unit in Ramathibodi Hospital, Mahidol University, Bangkok, Thailand from May 2001 to December 2001 were recruited. The inclusion criteria included women who had no contraindication to WHO eligibility criteria for IUD and willing to participate in the study. Insertion was performed during the first 5 days of the menstrual cycle or 6 weeks postpartum by an experienced gynecologist or resident. Prior to IUD insertion, history taking, bimanual pelvic examination, uterine length measurement with uterine sound were performed. A transvaginal ultrasound scan was carried out to identify location of IUD in uterine cavity after insertion. Women were asked to return for follow up at 6th and 12th week after insertion and history taking, bimanual examination, and transvaginal ultrasound were performed.

Ultrasound scanning of the uterus included a true longitudinal section to visualize the entire length of the endometrial cavity. The distance from the superior edge of IUD to the internal uterine wall in sagittal plane was measured (D), as fig. 1.

D = A-B

A = the distance from the superior edge of IUD to the outer edge of the uterine fundus

B = the myometrial thickness

Transvaginal ultrasound was performed by the authors using Hitachi EUB 415 with a vaginal transducer of 5MHz.

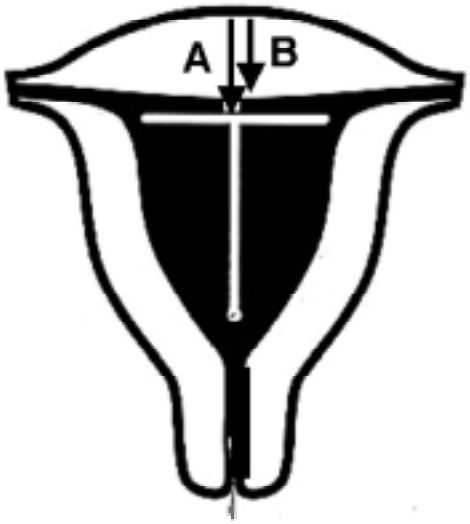

Fig. 1.

Definition of the IUD misplacement was D $\geq$ 3 mm at immediate post insertion.[9] The downward displacement was defined as an increase of more than 5 mm of the D in one or more measurement from the initial location.[7] Expulsion defined as visible protrusion of the stem of IUD through the external cervical os. The IUD was defined as cervically located when the vertical stem was found to lie completely in

the cervical canal.[9] Women who had the IUD located at cervical canal or stem of IUD protrude visibly through the cervical canal, had the IUD removed and were offered the option of a re-insertion or another contraceptive methods of their choice. Women in the study were followed up for 12 weeks. Participants who lost follow up before 12 weeks were included in the analysis up to the point they lost follow up, and were classified as censored afterwards. Gross cumulative rates for expulsion and downward displacement were calculated by Kaplan-Meier analysis.

Results

A total of 110 women were recruited at the beginning of the study. Twenty-seven women (24.5%) lost follow up at 6th week and twenty-seven of the remainders (32.5%) lost follow up at 12th week post insertion. Reasons for loss follow up included : no one take care of their babies, moved to another provinces and could not be contacted. Ninety percent of women who lost follow up were contacted by phone and all were still using IUD. Their main characteristics are presented in Table 1. The mean age of the women was 30.69 $\pm$ 7.59 years (range, 18-50 years), 67 of 110 women (60.9%) were post partum, 78.2% of the women had never used IUD before. The mean length of cavity measured by uterine sound was 7.2 $\pm$ 0.7 cm (range, 6.0-9.0 cm.). The median initial distance between the superior edge of IUD and the internal uterine wall (D) was 3 mm. (range 0.2-30 mm.). Five women had D >10 mm and two out of five who had D at 25 mm and 30 mm had early expulsion at 6th week. Downward displacement of at least 5 mm from initial location were found in 10 women, 6 were found at 6 weeks post insertion. The downward displacements were clinically recognized in 4 women, and the IUD were removed. The cumulative discontinuation rate were 2.67 % due to expulsion and 4.02 % due to downward displacement at 12 weeks (Table 2). No significant difference was demonstrated between the association of characteristics of women and either the expulsion, misplacement or downward displacement ($P > 0.05$).

Details of expulsion group were shown in table 3. By the end of 12th week, there were four expulsions. Three were misplaced at immediate post insertion (D >3.0 mm), 2 out of 3 werepostpartum and had expulsion of IUD at 6 th week after insertion. Distance between the superior edge of the IUD and internal uterine wall were 1.3, 3.1, 25 and 30 mm, respectively. All four women had never used IUD before.

Table 1. Characteristics of women initiate using Tcu 380A IUD

Characteristics		N [110]	%
Age	<20yr	4	3.6
	20-24 yr	22	20.0
	25-29yr	30	27.3
	30-34yr	22	20.0
	$\geq$35yr	32	29.1
Parity	1	58	52.7
	2	48	43.6
	3	4	3.7
Post partum status			
	Yes	67	60.9
	No	43	39.1

Characteristics	N [110]	%
History of IUD use		
Yes	24	21.8
No	86	78.2
External os to fundus [mm]		
60-69	19	17.3
70-79	65	59.1
80-89	21	19.1
≥90	5	4.5
Devices inserted by		
Staff	37	33.7
1st year resident	34	30.9
2st year resident	24	21.8
3st year resident	15	13.6

Table 2. Cumulative rates for expulsion and downward displacement

	6 wk [%]	12 wk [%]
Expulsion	2.10	2.67
Downward displacement	3.31	4.02

Table 3. Details of expulsion cases

Case	Age (yr)	Parity	Post partum	Hx of IUD use	Uterine sound (cm)	D [mm]	Level of doctor experience	Time of Expulsion [wks]
1	27	3	Yes	No	7.0	1.3	1st year resident	6
2	31	1	No	No	7.0	3.1	1st year resident	12
3	29	2	Yes	No	6.5	25.0	Staff	6
4	27	1	Yes	No	7.0	30.0	3rdyear resident	6

Discussion

Copper T IUDs, especially the Tcu-380A, are becoming the most widely used intrauterine devices in Thailand. To our knowledge, however, there were no study that examine the impact of location of IUD in uterine cavity on their expulsion. Our analysis showed that the distance between the internal uterine wall and the superior edge of the IUD immediate post insertion and downward displacement may have effect on expulsion. It should be noted that the study design is the prospective descriptive with transvaginal ultrasound intervention. It could be assumed that the correct placement of the IUD in the uterine fundus plays an important role in the IUDs expulsion. However, there was no study that indicate a definite location of the IUD which can predict the expulsion or failure of

contraceptions. In previous experimental study by Petta et al[9], removal of IUD which had D more than 3 mm could reduce expulsion rate. In our study the median of D was 3 mm and 53.6% of IUD location had D of at least 3 mm. From these data we could not find the correlation between D $\geq$ 3 mm and early expulsion. However, only 5 women out of 110 had D more than 10 mm and 2 of them had early expulsion. In another 2 expulsions, D were 1.3 and 3.1 mm. These expulsions could not be simply explained by the immediate location of IUDs post insertion. There may be another factors influencing the expulsion of IUDs which need more studies. Transvaginal ultrasound to locate the IUD post insertion may predict early expulsion in extreme cases which had D more 10 mm. Long term study may be needed to find out whether D related with late expulsion or not. So, we would not remove the IUD which were considered misplaced but instead emphasizing in counseling the women about self examination of IUD string and close follow up for the first three months to detect the expulsion and prevent a possible accidental pregnancy. This study showed that many of the IUDs considered misplaced from the uterine fundus may stay in its position for at least 12 weeks and still maintain their contraceptive efficacy. We did not find the correlation between age and expulsion rate at 12th week, as previously reported in an analytical approach.[8]

In this study, all women who had downward displacement with expulsion of IUD could be recognized clinically, so transvaginal ultrasound may not be necessary for detecting downward displacement. This study can not evaluate the definite location or downward displacement of the IUD that can predict the expulsion. Because the number of the women in this prospective study, which we intended to evaluate the location of the IUD in uterine cavity in relation to the expulsion are too small. Further studies to evaluate the IUD placement in long term users are needed to clarify this issue. Although there were no pregnancy during the first month of the IUD use in this study, we should follow up to confirm the presence of IUD in uterine cavity of women whose IUD were considered misplaced or downwardly displaced.

In conclusion, the distance between the internal uterine wall and the superior edge of the IUD immediate post insertion and downward displacement had a significant effect on the expulsion. However, performing routine transvaginal ultrasound in all the IUD users at 0, 6th and 12th week post insertion may not be possible in many centers and may not be cost effective. Hence, a more cost effective and reliable approach are to emphasize in counseling about self examination of the IUD strings, and to schedule the first follow up visit at the sixth weeks after insertion, when expulsions are more likely to occur. The correct insertion technique was also important to reduce the incidence of expulsion. In addition, screening the improperly placed IUD immediate post insertion with transvaginal ultrasound is useful for predicting the expulsion of IUD.

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