AN EVALUATION OF THE INTRAUTERINE CONTRACEPTIVE DEVICE

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INTRODUCTION

The Intrauterine Contraceptive Device (IUD) is widely used in the practice of contraception because of its high efficacy, low cost and easy insertion. This method has been employed in the Family Planning Clinic of the Singapore Family Planning and Population Board at the Kandang Kerbau Maternity Hospital since its inception in January 1966. This Clinic is one of the three IUD centres of the Board. Besides IUD, other contraceptive methods are also available at the Clinic. In the past two years, nearly two thousand women were fitted with IUD and followed up regularly at the Clinic. The purpose of this study is to assess the results of IUD among these cases with relation to its acceptability, contraceptive efficacy and side effects.

MATERIALS AND METHODS

From January 17th 1966 to December 31st 1967, one thousand nine hundred and thirty two first insertions and 165 reinsertions of IUD were performed at the Clinic. The Lippes loops were used exclusively. Women who have at least one childbirth and have no pelvic pathology were accepted for IUD insertion. Mild erosion of the cervix was not considered a contraindication. The insertions of IUD were done from four to six weeks to a few years after the last childbirth, and the great majority of insertions was performed at more than two months after delivery. No insertion of IUD was done during pregnancy.

The IUD wearers were asked to come back to the Clinic for follow up examination one month after the insertion, three months after the first revisit and then six to twelve months thereafter. They were also told to feel the thread of the loop in the vaginal canal with fingers by themselves twice a week. When they failed to feel the thread or when they had complaints after the insertion of IUD, they were requested to report to the Clinic as soon as possible. To those who failed to keep the appointment, reminders were sent one month later, if there was no response to two to three reminders, home visits were made by our staff or by the home visitors of the Maternal and Child Health Services.

Cases indicative of pelvic inflammatory diseases, abortion, translocation of loop or other gynecological conditions were referred to the Kandang Kerbau Maternity Hospital for investigation and treatment. Our Clinic was always informed of the diagnosis of these cases.

The IUD wearers keep their appointments well. Table I shows that out of 1932 cases with the first insertion of IUD, 16 cases were transferred to other centres for follow up for their own convenience, and another 12 cases had to be excluded from this study either because they had left the country for good (5 cases) or because they could not be traced (7 cases). Hence altogether 1904 cases or 98.6% of the total cases were regularly followed up. This presentation is based on the observation of these 1904 cases. The total duration of use of IUD in these cases is 23969 woman-months and their wearing period varies from a few days to over twenty three months with an average of 12.5 months.

TABLE I

FIRST INSERTION OF IUD BY SIZE OF LOOP

	Size B	Size C	Size D	Total
No. inserted	19	723	1190	1932
No. transferred	—	8	8	16
No. lost	—	9	3	12
No. studied	19	706	1179	1904

RESULTS

The number of the first insertions of IUD by month is shown in Fig. 1. It is obvious that more IUD were inserted in 1966 than in 1967

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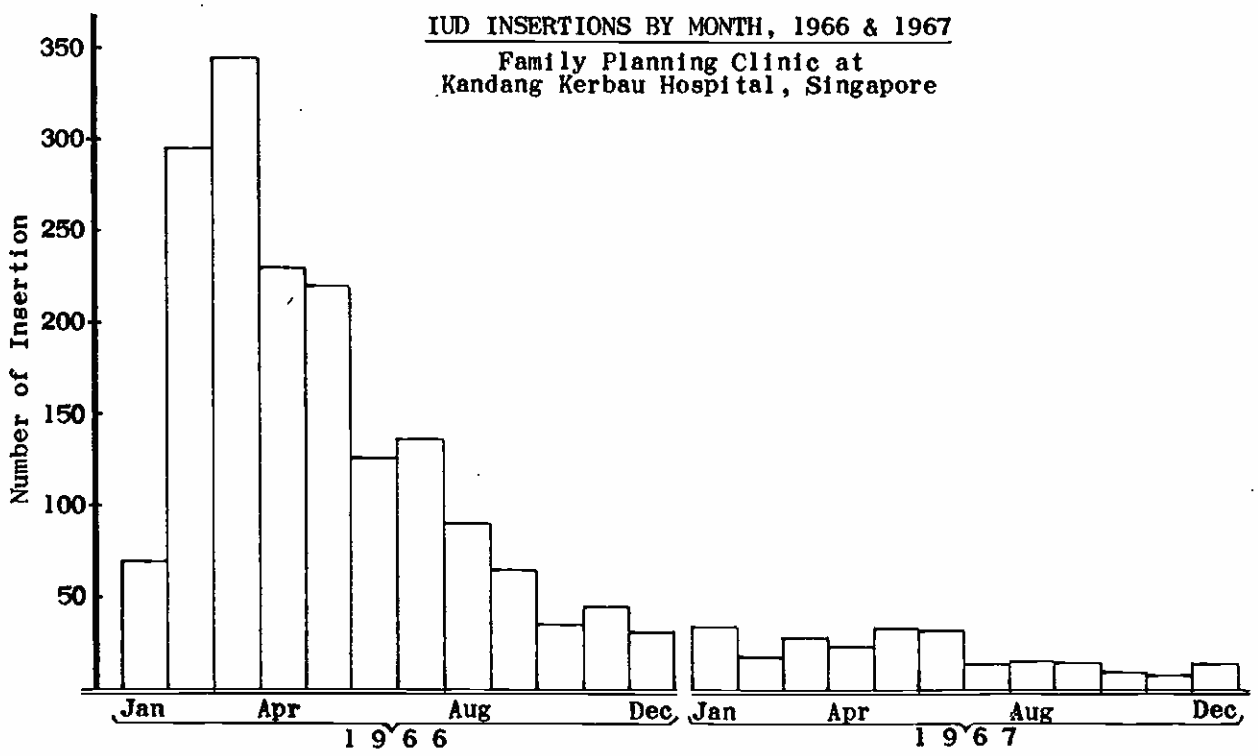

Fig. 1

TABLE II

NUMBER OF PREGNANCY AMONG 1904 IUD WEARERS BY SIZE OF LOOP

	Size B	Size C	Size D	Total
No. insertion	19	706	1179	1904
No. pregnancy	1	31	42	74
Rate %	5.2	4.4	3.6	3.9

TABLE III

OUTCOME OF 74 PREGNANCIES BY SIZE OF LOOP

	Delivery	Abortion	Not Due or Unknown	Total
Size B	1	—	—	1
Size C	12	7*	12	31
Size D	14	18	10	42
TOTAL	27	25	22	74

*Including one case of ectopic pregnancy.

and the number of insertions declined rapidly from August 1966 onwards, and that more size D loops were used than size B or C loops. At the end of 1967, 1087 out of 1904 women (57%) were still wearing IUD, with a total duration of 18106 woman-months and an average of wearing period of 16.6 months. Eight hundred and seventeen women had dropped off because of pregnancy, removal, expulsion or translocation of loop, with a total duration of use of IUD of 5863 woman-months and an average wearing period of 7.2 months. The out-come of these cases is described as follows:

Pregnancy: Table II shows that 74 pregnancies had occurred among 1904 IUD wearers, giving a pregnancy rate of 3.9% or 3.7 per hundred woman-years. The average duration between the insertion of IUD and pregnancy is 7 months. The outcome of these pregnancies is shown in Table III. There were three premature births, 24 full term deliveries with 3 sets of twins and all with normal babies, and 25 abortions. The outcome of another 22 pregnancies was either unknown or not due for delivery. Among the abortion cases, 20 pregnancies were terminated in the first 3 months and 5 abortions had occurred after 3 months of gestation. There were 15 spontaneous and 9 induced abortions and one ectopic pregnancy in the present series of cases. The case of ectopic pregnancy was admitted to the General Hospital for acute abdomen one month after the insertion of IUD. The left

fallopian tube was found ruptured at laparotomy, and the diagnosis of ectopic pregnancy was proven by histological section of the surgical specimen. The loop was removed from the vagina by the writer one month after the operation.

As to the fate of the loops in the pregnant cases, 24 loops were expelled and 32 loops were removed either before, during or after the termination of pregnancy. It is interesting to note that in one case of full term pregnancy, the loop was not expelled during delivery but was removed 8 weeks later from the vagina. In 5 cases of pregnancy with translocation of loop, the loops were removed by laporatomy in 2 cases and were left behind in 3 cases. The fate of loop was unknown in another 15 cases. The size of loop most likely has no relation to the occurrance of pregnancy ($P = 0.4$).

Expulsion: Expulsion of loop occurred in 214 of 1904 first insertions and in 88 of 152 reinsertions. The expulsion rate is 11.3% for the first insertions and 58% for all of the reinsertions. Table IV shows the number of insertions and the number of expulsions of IUD in relation to the size of loops. It is noted that the expulsion rate is much lower with the size D loop than with size B or C loops. The difference of the expulsion rates among the different sizes of loop is statistically highly significant ($P < 0.0005$). With the same size of loop, the expulsion rate increases with the frequency of the reinsertions.

The expulsion of loop was usually noticed by the IUD wearers. Some of the expulsions were found by the doctor during follow up examination. The loop was either completely expelled from the uterus or partially expelled from the cervical os. In the doubtful cases, the expulsion of loop was ascertained by X-ray examination.

Removal: Altogether 633 IUD wearers (33% of 1904 cases) had their loops removed for various reasons. Six hundred and thirteen loops were removed after the first insertion and 20 loops after the reinsertions. The average wearing period of IUD in these cases is 7.7 months. The loops were removed at the Clinic in 597 cases, and the procedure of removal is very simple and easy, and the double S-shape of the loop was well preserved. After the removal of the loop, these women usually accept other contraceptive methods. Table V shows the reasons

TABLE IV

EXPULSION OF IUD AFTER FIRST INSERTION AND REINSERTION

Size of Loop	First Insertion			Second Insertion			Third Insertion			Fourth Insertion		
	Insert	Expul	Rate	Insert	Expul	Rate	Insert	Expul	Rate	Insert	Expul	Rate
B	19	9	47.4%	1	1	100%	—	—	—	—	—	—
C	706	128	18.1%	51	39	76.5%	8	7	87.5%	1	1	100%
D	1,179	77	6.5%	80	34	42.5%	8	5	62.5%	3	1	33.3%
TOTAL	1,904	214	11.3%	132	74	56.1%	16	12	75%	4	2	50%

TABLE V

REMOVAL OF IUD BY REASONS AND SIZE OF LOOP

Size of Loop	Relevant reason	Pregnancy	To have baby	Fear of preg., translocation	Personal reason	Total
B	4	1	1	—	1	7
C	169	9	22	29	16	245
D	286	22	6	26	41	381
TOTAL	459	32	29	55	58	633
%	72.5	5.0	4.6	8.6	9.3	100.0

for the removal in relation to the size of loop. Three fourth of the removals was due to the relevant reasons such as pain, bleeding, giddiness or weakness. Fifty eight loops were removed because of personal reasons such as separation or death of the husband, permanent sterilization, request of the relative and so on. Fifty five loops were removed for the fear of pregnancy or translocation of loop, whereas actual pregnancy led to the removal of loop in 32 cases. Twenty nine cases had their loops removed for the planning of another pregnancy. The size of loop most likely has no relation to the causes of the removal ($0.8 < P < 0.9$).

Translocation: There were 10 cases of translocation of loop in 1904 IUD wearers, giving a rate of 0.52%. Five cases associated with pregnancy. Six of the ten cases had their loop inserted within two months after delivery. All of them had no symptoms. This condition was discovered only when the cases were sent for investigation for the missing thread or when the loop could not be removed from vagina at the Clinic. These cases were referred to the Kandang Kerbau Maternity Hospital for investigation, and the diagnosis of the translocation of loop was made by clinical examination, hysterosalpingogram and laparotomy.

The time of discovery of the translocation of loop varied from two days to one year after the insertion of IUD. Two cases were discovered within one month and six cases within two months. But the time cannot be known as to when the translocation of loop had actually taken place. Two cases reported to the Clinic of missing of the thread at two and five days after the insertion of loop respectively. The translocation of loop in these two cases could have taken place within this short period of time. Three cases had their loops removed by laparotomy and seven cases had their loops left behind.

The size of loop most likely has no relation to the occurrance of the translocation ($0.4 < P < 0.5$).

Pelvic Infection: A total of 33 cases of pelvic infection was recorded in the present series of cases. The incidence of the pelvic infection is 1.7%. The severity and the onset of infection are shown in Table VI. The pelvic infection was classified as mild in two third of the cases. The time of the onset of the infection varied from 9 days to 18 months after the insertion of IUD. The insertion of IUD probably had no relation to the cause of the pelvic infection. Mishell[4] mentioned in his study that bacteria have been eliminated from the uterus in about 80% of cases within 48 hours after the insertion of IUD and that the uterine cavity is sterile one month after the insertion. The findings of the present study support the statement of Rozin[6] that there is no evidence to suggest that the incidence or severity of endometritis increases with the prolonged retention of IUD.

TABLE VI

PELVIC INFECTION BY DURATION OF INSERTION OF IUD

Duration in Month	Mild	Moderate	Severe	Total
< 1	1	—	1	2
1 - 3	14	2	2	18
4 - 6	3	1	1	5
7 - 9	1	—	—	1
10 - 12	3	—	—	3
> 12	1	2	1	4
TOTAL	23	5	5	33

DISCUSSION AND COMMENTS

The use of IUD as a method of contraception was favourably accepted by the public in Singapore in the early part of 1966 as reflected by the number of insertion of IUD in the first few months of the year. But, the demand of this method is becoming less and less from August 1966 onwards. This decline is thought to be attributable partly to the ill founded rumors of the side effects of IUD according to the Annual Report of the Singapore Family Planning and Population Board[8], and partly to a publication in the local newspaper on the 26th July 1966 of a report from Hong Kong which stated that the insertion of IUD could cause ectopic pregnancy. Although corrections were made by the local medical authorities in the same newspaper on the following day, IUD has never since then regained its popularity. The ill-effect of that news was also borne out by the higher removal rate of IUD in Singapore as compared to other countries as shown in Table VII.

A pregnancy rate of 3.6% of the size D loop users in the present study is quite close to that reported by Hall[3] and Tietze[7] as shown in Table VII. It shows that IUD is a very effective

method in the prevention of pregnancy and is especially useful in mass application due to its simplicity and low cost.

According to the estimation of Tietze[7], 20 ectopic pregnancy cases would be expected in the present series of cases, but in fact there was only one such case. Cheng[3] reported three cases of ectopic pregnancy among 14000 IUD users in Singapore. He also mentioned that the number of ectopic pregnancy among the IUD wearers is smaller than the expected.

The size of loop most likely has no relation to the causes of pregnancy and the removal and translocation of loop in the IUD users, but, the size D loop definitely leads to much less expulsion after the insertion than size B or C loop. It is, therefore, reasonable to recommend the use of the size D loop instead of the size B or C loop.

The translocation of loop is a complication of IUD that many people feel most concerned and is associated with high pregnancy rate, i.e. 50% in the present series of cases. Its cause and the exact time of its occurrance are still not clear. It is thought that the insertion of IUD into the subinvoluted uterus could be one of the factors favouring the translocation. Ratnam[5] reported that the incidence of translocation of loop among the IUD wearers is ten times higher among the cases with the insertion done 4-8 weeks post partum than those with the insertion done immediately post partum. Tietze[7], Burnhill and Birnberg[1] reported less translocation when the loops were inserted three months or more after delivery. In the present study, in six of the ten cases (60%) of translocation of loop, the insertion was done within 2 months after delivery, but only in about 10% of the total cases under study the insertions were done within that period. It would appear that proportionately more translocation of loop had occurred in the cases with the loops inserted in less than 2 months after delivery. So far as the translocation of loop is concerned, it seems safer to use IUD 3 months after delivery.

The incidence of translocation of loop in this study is quite close to that reported by Ratnam[5] and is higher than those in other reports as shown in Table VII. This could be due to more complete and frequent follow-up, the awareness of the possibility of this complication, and to better medical facilities for complete investigation.

TABLE VII

COMPARISON OF RESULTS OF THE PRESENT STUDY WITH OTHER STUDIES

	Hall	Tietze	Present Study
Duration of study in month	24	24	23
Number of first insertion	737	7,399	1,179
Pregnancy rate %	3.2	4.2	3.6
Expulsion rate %	10.7	12.0	6.5
Removal rate %	17.2	28.0	32.6
Pelvic infection rate %	1.8	3.5	1.7
Translocation rate %	0.13	0.04	0.52
Drop off rate %	31.1	33.5	36.0

(All figures were based on Loop D except infection and translocation which included other sizes of loop).

SUMMARY

From January 1966 to December 1967, one thousand nine hundred and thirty two women were fitted with the Lippes loop at the Family Planning Clinic of the Singapore Family Planning and Population Board at the Kandang Kerbau Maternity Hospital. One thousand nine hundred and four cases (98.6%) have been followed up regularly, and one thousand and eighty seven of them were active IUD wearers at the end of the year 1967. The pregnancy rate was 3.7 per 100 woman-years of use of IUD. Complications like expulsion (11.3%), removal (33%) and translocation (0.52%) of loop, and pelvic infection (1.7%) are separately described and discussed. It is concluded that IUD is very effective in the contraceptive practice and is especially useful in the mass application. The Lippes loop size D is preferrable to other sizes and its insertion is better delayed till three months after delivery.

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REFERENCES

1. Burnhill, M.S. *et al* (1967): "Uterine perforation with intrauterine contraceptive devices." Am. J. Obst. & Gynec., 98, 135.
2. Cheng, W.C. (1967): "Tubal pregnancy associated with intrauterine contraceptive devices." Sing. M.J., 8, 252.
3. Hall, R.E. (1966): "A comparative evaluation of intrauterine contraceptive devices." Am. J. Obst. & Gynec., 94, 65.
4. Mishell, D.R. *et al* (1966): "The intrauterine device: A bacteriologic study of the endometrial cavity." Am. J. Obst. & Gynec., 96, 119.
5. Ratnam, S.S. (1968): "Translocation of Lippes loop." Brit. M.J. 1, 612.
6. Rozin, S. *et al* (1967): "Endometrial histology and clinical symptoms following prolonged retention of uterine contraceptive devices," Am. J. Obst. & Gynec., 97, 197.
7. Tietze, C. (1966): "Contraception with intrauterine devices." Am. J. Obst. & Gynec., 96, 1043.
8. First annual report (1966): "Singapore Family Planning and Population Board." 1, 22.