A PROSPECTIVE RANDOMIZED STUDY OF THE COPPER 7, MULTILOAD Cu 250 AND COPPER 220C IUDS IN SINGAPORE

T G McCarthy
L S Lim
S M M Karim
S S Ratnam

Department of Obstetrics and Gynaecology
National University of Singapore
Kandang Kerbau Hospital
Hampshire Road
Singapore 0821

T G McCarthy, MBBS, FRCS, FRCS (Ed), MRCOG, AM,

L S Lim, MBBS, MRCOG, AM

S M M Karim, BPharm (Lond), DSc (Lond), PhD (Lond), FIBiol (UK), MPS (UK)

S S Ratnam, MBBS, MD, FRCS, FRCS (Ed), FRSC (G), FRCOG, FRACS (Hon), AM

SYNOPSIS

This prospective randomized trial compares the effectiveness and complications of the Gravigard (7Cu200), Multiload Cu250 (MLCu250) and the copper T 220C (TCu220C) IUDS. Two hundred of each device were inserted and studied for a two year period. The 7Cu220 had a higher pregnancy rate than the MLCu250 ($p < 0.05$) and the TCu220C ($p < 0.001$). The expulsion rate of the MLCu250 was lower than that of the TCu220C ($p < 0.05$) and the 7Cu200 $p < 0.001$). Total use-related terminations were significantly different between the 3 devices ($p < 0.05$) but no one device was significantly better than the other two.

INTRODUCTION

A randomized prospective trial is the only effective way of comparing intrauterine devices (IUDs) in clinical practice because of the great differences which are found when the same device is used in different clinics and in different countries (1, 2, 3). Copper bearing IUDs generally have lower complication rates than the earlier inert devices with equivalent or better contraceptive protection (4, 5).

Recruitment for this 2 year trial started in 1976 to assess the comparative complication rates of the 7Cu200 and two newer copper bearing devices the TCu220C and MLCu250. IUD use had been poor in Singapore after the adverse publicity associated with the post partum Lippes Loop program. (6, 7) In the mid 1970's the University Unit of Obstetrics and Gynaecology had run two trials to assess immediate post abortion and interval IUD insertion with favourable results (8, 9) but only the Lippes Loop was available through Government Maternal and Child Health Clinics.

These results represent the Singapore component of a 3 centre (Singapore, Medan, Kuala Lumpur) trial, run in conjunction with the International Development Research Centre, Ottowa, Canada.

MATERIALS AND METHODS

Two of the IUDs involved in the trial (MLCu250 and 7Cu200) are now well established in Singapore and have been extensively used worldwide. (10) The TCu220C has consistenly proved to be a highly effective device in several World Health Organization trials. (11, 12) Detailed descriptions of the devices and insertion techniques are available elsewhere. (3, 10)

The 600 patients recruited between April 1976 and November 1978 were randomly allocated to one of the three IUDs using a series of pre-sealed envelopes. All were healthy volunteers aged 19 to 35, of proven fertility and exposed to the risk of pregnancy (currently cohabiting with intercourse at least twice a month). There were no significant differences in the age, parity, race or immediate past contraceptive use in the 3 groups (Tables 1-4).

Insertions were performed at least 8 weeks postpartum (or 4 weeks postabortion) by one of twenty different physicians. A Papanicolaou smear was taken at

TABLE 1 AGE

	>20	20-24	25-29	30-34	35-39	Total
7Cu200	11	66	80	28	15	200
TCu220C	7	68	77	33	15	200
MLCu250	13	54	79	35	19	200
	31	188	236	96	49	600
%	5.2	31.3	39.3	16.0	8.2	

TABLE 2 RACE

	Chinese	Malay	Indian	Others	Total
7Cu220C	148	24	27	1	200
TCu220C	155	20	20	5	200
MLCu250	141	26	79	4	200
	444	70	76	10	600
%	74.0	11.7	12.7	1.7	

TABLE 3 PARITY

	0	1	2	3	4	=>5	Total
7Cu200	37	40	73	33	11	6	200
TCu220C	40	33	89	27	7	4	200
MLCu250	39	46	74	30	8	3	200
	116	119	236	90	26	13	600
%	19.3	19.8	39.3	15.0	4.3	2.2	

TABLE 4 PREVIOUS CONTRACEPTION

	None	Pill	Inject	IUD	Others	Combined	Total
7Cu220	44	35	4	5	75	37	200
TCu220C	44	36	1	7	63	49	200
MLCu250	40	39	3	7	79	32	200
	128	110	8	19	217	118	600
%	21.3	18.3	1.3	3.2	36.2	19.7	

admission and only patients with no recognised contra-indications to IUD use (13) and a normal pelvic examination were admitted to the trial. Follow up appointments were scheduled for 6 weeks and 3, 6, 12 and 24 months. Data was recorded for all unscheduled visits and when necessary letters, telephone calls and, home visits used to trace defaulters.

Data from the first segment of use was computed using a modification of the Life Tab program (5.0) given us by the Population Council. Two month ordinal segments were analysed instead of the 1 month system proposed by Tietze and Lewit (14) because of limitations in our computer hardware facilities at the time of analysis. Terminations were grouped according to the definitions of Tietze and Lewit (14) except that the termination 'planning pregnancy' was classed as non use-related. This minor change makes no difference to the number of terminations in each category, to the overall continuation rates nor to the gross termination rates.

RESULTS

Two hundred patients were recruited for each device. The net and gross cumulative termination rates for each device at 12 and 24 months are shown in Tables 5 and 6. Ninety eight (49%) 7C8200 users completed the study compared with 116 (58%) for both the TCu220C and the MLCu250. Four percent of patients were lost to follow up and 1% withdrawn by 'investigators choice'.

There were significant differences in the pregnancy rates between the 3 devices. Pregnancy was more common with the 7Cu200 than with the TCu220C ($p<0.001$) and MLCu250 ($p<0.05$). Expulsion is less frequent with the MLCu250 when compared with the 7Cu200 ($p<0.001$) and the TCu220C ($p<0.05$). Though there are significant differences in both use-related and total termination rates between the three devices ($p<0.05$) no one device is significantly better than either of the other two.

TABLE 5 CUMULATIVE TERMINATION RATES PER 100 WOMEN AT 12 MONTHS

Termination events	7CU200 N = 200			TCu220C N = 200			MLCu250 N = 200		
	Termination rates			Termination rates			Termination rates		
	N	Net	Gross	N	Net	Gross	N	Net	Gross
(Use-related)									
Accidental pregnancy	9	4.8	5.7	1	0.5	0.6	3	1.6	1.7
Expulsion	22	11.4	12.1	14	7.2	7.8	3	1.5	1.6
Removals for									
pain/bleeding	16	8.5	9.9	24	12.2	13.0	15	7.7	8.0
other medical	6	3.2	3.8	4	2.0	2.4	6	3.0	3.2
other personal	7	3.7	4.6	5	2.5	2.9	7	3.7	4.1
Total use-related	60		31.5	38		24.5	34		17.4
(Non use-related)									
Removals for									
planning pregnancy	9			10			12		
investigators choice	2			2			2		
Lost to follow up	8			7			2		
Total non use-related	19			19			16		
Continuing in study	121(60.5)			133(66.5%)			150(75%)		
Woman months use	1753			1943			2088		

TABLE 6 CUMULATIVE TERMINATION RATES PER 100 WOMEN AT 12 MONTHS

Termination events	7CU200 N = 200			TCu220C N = 200			MLCu250 N = 200		
	Termination rates			Termination rates			Termination rates		
	N	Net	Gross	N	Net	Gross	N	Net	Gross
(Use-related)									
Accidental pregnancy	14	7.6	9.8	1	0.5	0.6	6	3.3	4.0
Expulsion	28	14.8	16.9	15	7.8	8.5	4	2.1	2.3
Removals for									
pain/bleeding	19	10.8	13.3	26	13.4	14.4	22	11.7	12.6
other medical	8	4.3	5.4	7	3.8	4.7	11	5.9	6.7
other personal	8	4.3	5.4	7	3.7	4.4	8	4.9	5.7
Total use-related	75		41.9	56		29.1	51		27.8
(Non use-related)									
Removals for									
planning pregnancy	14			18			26		
investigators choice	2			2			2		
Lost to follow up	11			8			5		
Total non use-related	27			28			33		
Continuing in study	98(49%)			116(58%)			116(58%)		
Woman months use	3066			3448			3640		

DISCUSSION

The Singapore segment of this prospective trial differed from the other two centres (Medan and Kuala Lumpur) in that 20 doctors of various seniority and experience were involved in insertion of the devices. (15) The World Health Organisation uses the termiology 'phase IV trial' for such studies where physicians with no special training are involved. In IUD studies the results obtained from different centres and different physicians often vary more than differences between devices themselves depending on the skill or experience of physicians (16). Though highly controlled trial conditions are necessary in the early phases of testing a new device the best test for use of an IUD on the open market is when a wide variety of staff are involved.

Our results show that the 7Cu200 gives less contraceptive protection and has more complications than either the TCu220c or the MLCu250. The particular advantage claimed for the 7Cu200 is that its narrow insertion tube (0.3mm) makes it particularly useful for insertion in nulliparious patients. We believe that IUDs are best avoided in nulliparous patients because of the slight but potentially important risks of pelvic inflammatory disease and ectopic pregnancy unless these women are not able to use other contraceptive methods or have proved they are not able to use them reliably. (17) All IUDs are best inserted within 7 days of the onset of menses since at this time there is no risk of pregnancy and the cervical canal is relatively dilated. All our patients were of gravida 1 or above and few difficulties with insertion were reported but it is noteworthy that in these few the 7Cu200 caused the greatest number of difficulties (15).

The '7' configuration, with its assymetrical intrauterine position, would seem on logical grounds to be inherently inferior to the 'T' (or its modifications such as the Multiload). Since the pregnancy rate and expulsion rate of the 7Cu200 is higher than for alternative devices in Singapore we are no longer using the device in our Fertility Control Clinic.

Both the TCu220C and the MLCu250 gave good contraceptive protection. However, the expulsion rate was higher with the TCu220C ($p<0.05$) and the MLCu250 was easier to insert (15, 17).The simplicity of the Multiload insertion system has much to recommend it enabling less experienced staff to place the device correctly at the fundus with minimal risk of perforation. It is also easier with the Multiload system to maintain full asepsis when the device does not have to be digitally inserted into the sheath (as with the TCu220 and the 7Cu200).

It has been shown experimentally that the Multiload requires greater force for removal than the standard 'T' shape (19) probably because the arms cross over and impact on the uterine wall of the opposite side when the thread is pulled. This feature may well be related to the exceptionally low expulsion rates associated with the Multiload design. We found no particular difficulty removing the MLCu250 but have encountered fracture and retention of an arm during attempted removal of a Multload device (20).

One advantage claimed for the TCu220 is that the copper cuffs are not susceptible to breakage which increases significantly in copper wound devices after 2 years (21) but at a variable and unpredictable rate (22). We have seen significant wire degradation in both 7Cu200 and MLCu250 devices but not with the TCu220C whch has a potential life span of 15 years.

Since the insertion systems of the TCu220C and MLCu250 are essentially different the choice of which of the two devices to use must depend on the skills of the physician. However, the high pregnancy and expulsion rates of the 7Cu200 when compared with the other two devices makes it less suitable for general use.

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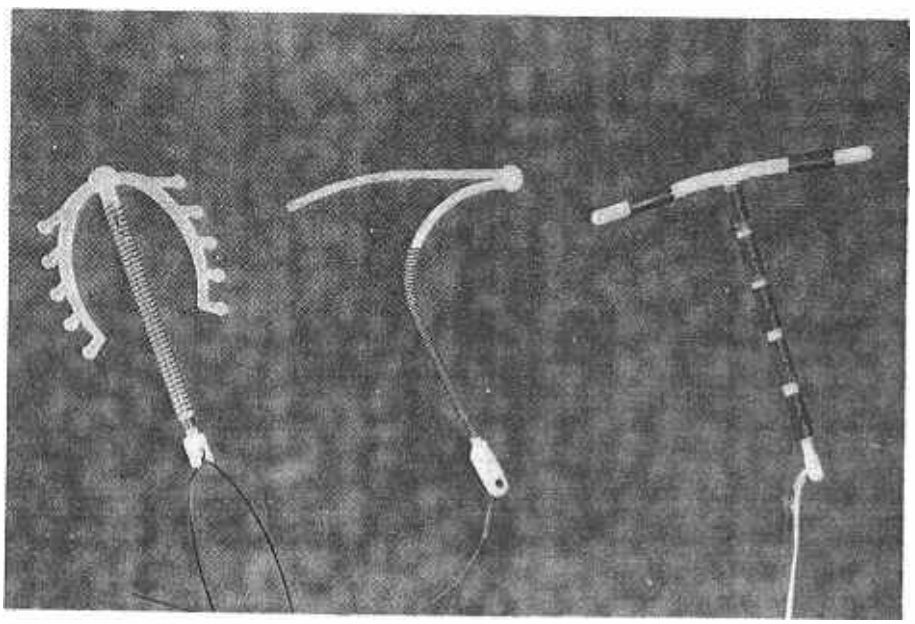

FIG. 1: IUDs in the trial — MLCu250, 7Cu200 and TCu220C (Left to right).

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