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Insertion of an intrauterine contraceptive device after induced or spontaneous abortion: a review of the evidence

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Objective Assess the safety and efficacy of intrauterine contraceptive device (IUCD) insertion immediately after induced or spontaneous abortion.

Design Systematic search for randomised trials that had at least one treatment arm that involved IUCD insertion immediately after an induced or spontaneous miscarriage using Medline, Popline, EMBASE, and review articles supplemented by correspondence with investigators.

Population Women of any age or gravidity who had an IUCD inserted immediately after evacuation for spontaneous or induced abortion.

Methods Articles were abstracted and the raw data from tables were analysed with RevMan 3.1 software. We focused on Tietze-Potter gross life table probabilities with denominators of person-time of exposure.

Main outcome measures Rates of perforation, expulsion, pelvic inflammatory disease, contraceptive failure, and method continuation.

Results Complication rates for immediate post-abortal IUCD insertion were low. Perforation was rare with a rate of approximately one per 1000 insertions. One year gross cumulative expulsion rates ranged from 1.8% to 12.6%, pregnancy rates from 0.6% to 2.1%, and continuation rates from 54% to 90%. The net discontinuation rate due to pelvic inflammatory disease was low, ranging from 0.0 to 0.8 per 100 women at one year. Increasing gestational age at insertion was associated with increased expulsion rates.

Conclusions Post-abortal IUCD insertion is safe and effective. The risks of perforation, expulsion, pelvic inflammatory disease and contraceptive failure were low and similar to those reported for interval insertion. Second trimester gestational age is associated with an increased risk of expulsion. Immediate insertion may have a higher expulsion rate than delayed insertion. However, these risks may be outweighed by the benefit of immediate contraception.

INTRODUCTION

For those women who choose an intrauterine contraceptive device (IUCD) as their post-abortal method of contraception, immediate insertion has many benefits compared with later insertion. Ovulation returns soon after abortion, with half of women ovulating by 21 days after the procedure[1]. Immediate post-abortal insertion provides immediate contraceptive protection. Furthermore, the woman avoids the potential inconvenience, discomfort and bleeding of a separate insertion procedure. Finally, her motivation for contraception is often high.

However, clinicians have feared that rates of IUCD perforation and expulsion may be higher in the post-abortal uterus due to its softness and enlargement. Immediate post-abortal IUCD insertion may increase the risk of upper genital tract infection after abortion. Finally, the contraceptive efficacy of the IUCD after post-abortal insertion and the method continuation rate are unclear. The purpose of this review was to assess the safety and efficacy of immediate post-abortal IUCD insertion.

METHODS

We performed a systematic search of the literature for randomised controlled trials that had at least one treatment arm that involved IUCD insertion immediately after an induced or spontaneous abortion using Medline, Popline, the Cochrane Controlled Trials Register and EMBASE, complemented by review articles and contacts with the investigators. We used the following key word combinations: (*post-abortal IUCD insertions* or *IUD* or *IUCD* or *intrauterine devices*) and (*post-abortion* or *post-abortal* or *abortion, induced* or *abortion, therapeutic* or *abortion, spontaneous*) and (*random* or *randomized controlled trial* or *controlled clinical trial* or *random*

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2

Table 1. Randomised controlled trials of immediate post-abortal IUCD insertion. MLCu = multiload copper; NR = not reported; Cu = copper.

Study	Participants	n	Follow up: Years	Follow up: Woman-years	Rate[a]	Comparisons	Cumulative incidence per 100 women at 1 year: Expulsion	PID	Pregnancy	Perforation	Continuation at 1 year (%)
Gillett et al.[12]	Women having first-trimester vacuum aspiration abortion at 3 sites in Canada.	259	1	95	Net	Immediate Insertion Copper 7	15.4	NR	2.3	NR	NR
						Delayed Insertion Copper 7	2.8	NR	0.0	NR	NR
Lim et al.[16]	Women aged 18-40 years having first-trimester suction curettage abortion in Singapore	549	2	820	Gross	MLCu 250	1.9	NR	0.8	NR	80
						MLCu 375	1.8	NR	2.1	NR	71
McCarthy et al.[13]	Women age 16-40 years having 'elective' abortion in Singapore.	400	2	541	Gross	Nova T	6.5	NR	1.8	NR	NR
						MLCu 250	6.3	NR	0.6	NR	NR
Nielson et al.[14]	Women having vacuum aspiration abortion (96% in the first trimester) in Denmark & Finland.	331	3	565	Gross[b]	Nova T	17.3[b]	11.2[b]	2.0[b]	NR	33.8[b]
						Copper T	11.9[b]	7.6[b]	8.9[b]	NR	37.5[b]
Randic & Balogh[17]	Women having first-trimester D&C abortion in Yugoslavia	464	2	NR	NR	Hydron-coated Spring Coil	3.4	NR	0.5	NR	90
						Spring Coil	3.6	NR	1.0	NR	91
Randic et al.[15]	Women age 18-40 years having first-trimester 'medical' abortion in Yugoslavia.	400	10	2057	Gross	Lippes Loop D	12.6	NR	4.6	NR	78
						Lippes Loop D + Cu Sleeve	4.5	NR	0.6	NR	90
WHO 1983a[6]	Women having elective abortion (96% first-trimester, 94% by suction and/or sharp curettage) in eight countries[c]	2340	2	2887	Net	TCu 220C	4.4	0.3	1.7	0.1	61
						Lippes Loop D	9.6	0.3	3.7	0.0	55
						Copper 7	8.4	0.7	3.6	0.3	54
WHO 1983b[11]	Women having evacuation of the uterus (89% <13 weeks gestation, 99% by D&C) for spontaneous abortion in six countries[d]	1060	2	1364	Net	TCu 220C	9.2	0.8	0.7	0.0	65
						Lippes Loop D	13.2	0.0	2.4	0.3	60
						Copper 7	12.7	0.4	1.1	0.0	63

[a] Net (competing) and Gross (non-competing) cumulative rates.
[b] Rates from Nielson *et al.*[14] reported at 3 years after insertion.
[c] Cuba, Yugoslavia, United Kingdom, Zambia, India, South Korea, Singapore, Hungary.
[d] Egypt, United Kingdom, Zambia, Philippines, Chile, Singapore.

3

allocation or *clinical trial* or *randomized controlled trials*.) We looked in the list of references from these articles for additional citations. We also sent our list of citations to investigators in the field to seek other studies we might have missed.

We included a study if it was a randomised controlled trial with at least one treatment arm of post-abortal IUCD insertion, but did not specify the randomised comparison made. We found 12 such trials, but excluded one due to alternate rather than random assignment[2] and one due to lack of our main outcomes[3]. We excluded two studies[4,5] due to unethical practice. In each, the researchers performed sham IUCD insertions during which the women believed they received an IUCD and were protected against pregnancy, but one was not inserted. Additionally, these two studies had design flaws that would have disqualified them; one reported only bleeding and pain outcomes at one month[5] and the other reported outcomes at six months but did not provide data on person-time exposure or loss to follow up[4].

Of the resultant eight trials, seven compared different devices in the post-abortal setting and one compared immediate to delayed insertion timing (Table 1).

The trials enrolled women of any age or any gravidity who underwent IUCD insertion immediately after curettage for either spontaneous or induced abortion. In one World Health Organisation (WHO) study[6], nearly all patients had suction curettage, but 2.3% of the subjects underwent medical abortion with prostaglandins. The nine trials took place in 11 countries (Canada, Singapore, Denmark, Sweden, Yugoslavia, Finland, Egypt, England, Zambia, Philippines, and Chile) during the 1970s and 1980s (Table 1).

Two reviewers read the titles and abstracts of all potential citations, reviewed the articles, and independently examined each for possible inclusion and quality[7]. We abstracted the resultant articles and formatted the data in absolute risks with common person-time denominators focusing on Tietze-Potter gross life table probabilities[8,9]. Using Cochrane Collaboration RevMan 3.1 software, we calculated Peto odds ratios for comparisons made within each trial[10].

We aggregated the results for all three devices within each of the two WHO trials[6,11]. For pregnancy and pelvic inflammatory disease, the numerators were the number of discontinuations for a given reason and the denominators were person-time units of exposure. For perforation, expulsion, and continuation the numerators were the number of discontinuations for a given reason and the denominators were the number of insertions. We aggregated using the RevMan 3.1 software. It produced reasonable results, but does not, as yet, fully handle survival data[10].

The main outcomes were rates of perforation, expulsion, upper genital tract infection, contraceptive failure, and method continuation.

RESULTS

Eight trials met our inclusion criteria (Table 1). Overall, the two WHO studies were the largest and best, with 4476 woman-years of data[6,11]. They used standardised definitions and explicit reporting of outcomes. They reported their results in net (competing) cumulative rates. Each trial compared three devices (TCu 220C, Lippes Loop D, Copper 7), the first in the setting of insertion after induced surgical abortion[6], the second after curettage for miscarriage[11]. We derived the following rates from these two WHO-conducted studies, pooling data from all three devices within each trial.

At two years of follow up, the trial of IUCD insertion immediately following induced abortion[6] reported three perforations in 2348 insertions (one per 1000 insertions), 157 expulsions (7%), 70 intrauterine or ectopic pregnancies (two per 100 woman-years), and 12 cases of pelvic inflammatory disease (0.4 per 100 woman-years). The trial of IUCD insertion following miscarriage[11] reported one perforation in 1060 insertions (0.9 per 1000 insertions), 128 expulsions (0.9%), 21 intrauterine pregnancies (two per 100 woman-years), and three cases of pelvic inflammatory disease (0.2 per 100 woman-years) at the end of two years. For both trials, continuation rates at one year ranged from 54% to 64%[6,11].

In these WHO trials, the Copper T 220C proved superior to the Lippes Loop D and Copper 7. The combined data from both trials showed that the TCu 200C had significantly lower pregnancy and expulsion rates than the other two devices. The likelihood of pregnancy for the TCu 200C was 60% lower (OR 0.4, 95% CI 0.2–0.7) than the Lippes Loop D and 50% lower (OR 0.5, 95% CI 0.3–0.8) than the Copper 7[6,11].

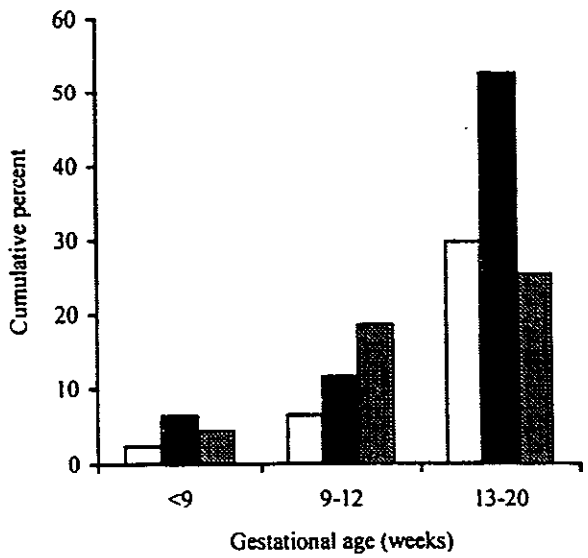

Fig. 1. Cumulative risk of expulsion at 12 months, by gestational age at induced abortion and type of IUCD[6]. □ TCu 220C; ■ Lippes Loop D; ▨ Copper 7.

4.

Table 2. Study quality measures of randomised controlled trials of immediate post-abortal IUCD insertion.

Study	*A priori* hypothesis	Sample size or power calculation	Computer-generated random sequence	Allocation concealment	Masked assessment	Notes
Gillett *et al.*[12]	No	No	Yes[a]	Yes[a]	No	40% of women assigned to delayed insertion did not return
Lim *et al.*[16]	No	No	Yes[a]	Yes[a]	No	
McCarthy *et al.*[13]	No	No	Yes[a]	Yes[a]	No	
Nielson *et al.*[14]	No	No	Unknown	Unknown	No	Rates given at 36 months only.
Randic & Balogh[17]	No	No	Yes[a]	Yes[a]	Yes	Reported only rates, not raw data.
Randic *et al.*[15]	No	No	Yes[a]	Yes[a]	Yes	
WHO 1983a[6]	No	No	Yes[a]	Yes[a]	No	Twelve patients with complications within 48 hours of insertion were excluded from analysis.
WHO 1983b[11]	No	No	Yes	Yes	No	One patient with complications within 48 hours of insertion was excluded from analysis.

[a] Confirmed by communication with authors.

5

In the one trial that directly compared immediate with delayed post-abortal insertions[12], the authors found no statistically significant differences. The study protocol called for insertion of the Copper 7 device either immediately after abortion or three to five weeks later. The higher expulsion rates in the immediate insertion groups (OR 2.9, 95% CI 1.0–8.7) was not statistically significant. After abortion, 40% of women who were to receive delayed insertion did not return for the procedure.

For contraceptive efficacy, the Multiload Copper 250 (MLCu 250) performed better than the Nova T[13], which performed better than the Copper T 200[14]. No other significant differences were found in these two comparisons. Addition of a copper sleeve to the Lippes Loop D significantly improved contraceptive efficacy and reduced rates of expulsion[15]. No significant differences were found between the outcomes for the MLCu 250 and the MLCu 375[16] or for the Spring Coil with and without the hydrogel coating[17].

Risk of expulsion increased with advancing gestational age (Fig. 1). In the WHO study after induced abortion[6], this association was significant for all three devices tested. For the TCu 220C, the risk of expulsion rose 4.5 fold from late first-trimester to second-trimester abortions.

Overall, the trials were of fair quality (Table 2)[7]. None reported *a priori* hypotheses or sample size or power calculations. Most of the reports lacked specific information about the methods of randomisation and allocation concealment, and communication with authors was required to confirm methodological details. Only two trials[15,17] explicitly reported masking of the clinicians who performed follow up exams.

DISCUSSION

Post-abortal IUCD insertion is both safe and effective. The absolute rates of perforation, expulsion, upper genital tract infection, contraceptive failure and method discontinuation were all low. These rates are comparable to those reported for interval IUCD insertion with modern copper devices[18–23]. Overall, devices with copper had lower pregnancy rates than those without copper, and devices with a 'T' shape had lower expulsion rates compared with other shapes. The risk of expulsion increased with increasing gestational age[6,11] and expulsion may be higher in immediate compared with delayed post-abortal insertion[12].

Increasing gestational age increases the risk of expulsion, but no clear threshold exists. Although clinicians may view a 30% risk of expulsion as excessive, a woman may find acceptable a 70% chance that she needs only one procedure. Counselling her about the chance of expulsion will allow her to decide what risk of expulsion she is willing to take to avoid a second procedure. In such cases, the one-month follow up examination may be crucial to identify asymptomatic expulsion.

In the one trial that directly compared timing of insertion, there was a non-significant trend toward higher expulsion for immediate insertion compared with insertion three to five weeks after abortion. No other differences emerged[12]. Its small numbers, lack of a power calculation, and high loss to follow up limit inferences from this study. In the delayed insertion group, a significant proportion of women (40%) did not return. These women may have begun alternative contraception or they may have chosen to use no contraception.

Insertion of an IUCD at the time of abortion has several benefits. The woman initiates highly effective contraception before her next ovulation and she avoids the need for a separate insertion procedure. Clinicians' traditional fears of high rates of perforation or pelvic inflammatory disease appear unfounded. Low rates of pelvic inflammatory disease were also evident in the treatment of miscarriage in settings where some 'spontaneous' abortions may have been clandestine induced abortion[11].

Professional guidelines and industry package labelling that argue against post-abortal IUCD insertion lack a scientific foundation. While the risk of expulsion is greater with increasing gestation and may be greater for immediate than delayed insertion, these potential disadvantages may be outweighed by the ability to provide immediate highly effective contraception to women with one procedure.

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6

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7