Original research article

Impact of immediate postabortal insertion of intrauterine contraception on repeat abortion☆

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Abstract

Background: Of the 1.3 million abortions performed annually in the United States, approximately half are repeat procedures. Immediate postabortal intrauterine device (IUD) insertion is a safe, effective, practical and underutilized intervention that we hypothesize will significantly decrease repeat unintended pregnancy and abortion.

Study design: All women receiving immediate postabortal IUD insertion in eight clinics of a Northern California Planned Parenthood agency during a 3-year period comprise the IUD cohort. We selected a cohort of controls receiving abortions but choosing other, non-IUD contraception on the day of the abortion visit in a 2:1 ratio matched by date of abortion. We obtained follow-up data on repeat abortions within the agency for both cohorts through 14 months after the 3-year period. We evaluated differences in repeat abortion between cohorts. All analyses were intent-to-treat.

Results: Women who received an immediate postabortal IUD had a lower rate of repeat abortions than controls (p<.001). Women who received a postabortal IUD had 34.6 abortions per 1000 woman-years of follow-up compared to 91.3 for the control group. The hazard ratio for repeat abortion was 0.38 [95% confidence interval (CI), 0.27–0.53] for women receiving a postabortal IUD compared to controls. When adjusted for age, race/ethnicity, marital status, and family size, the hazard ratio was 0.37 (95% CI, 0.26–0.52).

Conclusion: Immediate postabortal intrauterine contraception has the potential to significantly reduce repeat abortion.
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Keywords: Repeat abortion; IUD; IUC; Intrauterine contraception; Postabortal

1. Introduction

Among the 1.3 million women having abortions annually in the United States, approximately half are repeat procedures [1]. Studies conducted since the legalization of abortion have confirmed that women seeking a repeat abortion are equally [2] or more likely [1,3–6] to have been using a contraceptive method at the time of conception than women seeking a first abortion and that, among those who used contraception, they are more likely to have used a relatively effective method [1–4,6,7]. With "typical" use, moderately effective hormonal methods such as the pill, the patch, and the vaginal ring have approximately 8% annual failure rates in the general population [5]. However, in the postabortal population, even much more effective methods, such as depot-medroxyprogesterone acetate, have been shown to have failure rates as high as 16% due to discontinuation [8]. To assist women in avoiding unintended pregnancy, more effective, convenient and long-acting contraception would be advantageous in women with a history of induced abortion.

Intrauterine contraception meets the desired criteria. Its contraceptive efficacy is similar to or better than tubal sterilization [9]. Intrauterine devices (IUDs) are rapidly

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effective, have high continuation rates (78–81%) compared to other methods [5] and have rapid return to fertility upon removal. They are discreet and do not require multiple repeat visits after insertion for continuation.

Given that up to 83% of abortion clients ovulate within the first cycle after the procedure [10], the risk of repeat pregnancy is high without good contraception. Delayed postabortal IUD insertion may not be adequate with one study showing that 40% of clients did not return for the insertion [11]. Women who have an IUD inserted immediately after an abortion may therefore have significantly fewer unintended pregnancies and repeat abortions than women scheduled for insertion at a follow-up visit. A recent decision analysis comparing immediate to delayed IUD insertion estimated a mean difference of 28 unintended pregnancies per 1000 women in the initial year following abortion [12].

Despite the need for immediate, highly effective contraception following abortion, lingering misperceptions regarding IUD safety exist in the United States among both health care providers and the public [13–15] and contribute to its low utilization in postabortal women in this country. Furthermore, among the small percentage of patients and their providers who do choose intrauterine contraception, delayed insertion is still the norm. We hypothesize that immediate postabortal IUD insertion will significantly decrease subsequent unintended pregnancy and repeat abortion in comparison to other forms of contraception.

2. Materials and methods

We conducted a multisite study of three interventions to minimize barriers to IUD use, including immediate postabortal IUD insertion, at a Northern California Planned Parenthood agency from November 2002–October 2005. Results of the original study, including impact on IUD utilization, have been described elsewhere [16]. In March 2004, national Planned Parenthood Standards and Guidelines were individualized for our agency to permit immediate postabortal IUD insertion in the absence of known or suspected infection, contraindications or special conditions [17]; no postabortal insertions had previously occurred in this population. After receiving standard contraceptive counseling, postabortal IUD candidates desiring this method completed an IUD risk factor assessment, read IUD client information and provided informed consent.

We selected participants using retrospective billing data from the InfoPoint practice management system. All women who initiated IUD use on the day of an aspiration abortion during the study (n=673) were selected to comprise the study cohort. Among any women receiving more than one IUD during the study period, the date of first recorded insertion was designated as the index date to ensure that we appropriately captured repeat abortions among women with IUDs.

We selected a cohort of controls who also received an aspiration abortion but who chose other, non-IUD contraception on the day of the abortion visit. For each study subject who received a postabortal IUD, we selected two women who also had aspiration abortions (but chose a different form of contraception) on the same day, using a stratified random sampling technique. Women who declined any contraceptive method or received emergency contraception only were not included in the control group. We chose to match on the date of abortion to ensure that groups had equal follow-up. We lacked an adequate sampling frame to match on any other client characteristics, such as age or parity.

If a woman was randomly selected as a control twice (due to multiple abortions during the study period), we kept her *second* incidence of abortion as her index date and discarded the first, ensuring that any bias in results would be directed toward the null. We selected controls from the appropriate date of abortion to replace those discarded using simple random sampling. If there were not enough abortion patients on a specific date to ensure adequate controls, we randomly selected additional controls from women who had abortions within 1 week of the target date until we obtained the desired sample size.

We calculated frequencies (for categorical variables) and distributions (for continuous variables) of demographic data at the index date and compared cohorts using a χ^2 statistic or Student's t test, respectively.

To determine rates of repeat abortions, we pulled from the InfoPoint database all instances of aspiration and medication abortion within the eight agency clinics from the beginning of the study period through December 31, 2006 (14 months after the end of study enrollment). Medication abortion was included here to ensure that all repeat abortions were captured to calculate repeat abortion rates. We then searched the abortion data for the unique patient identifiers of our IUD and control cohorts, limiting our search to the time period after the index abortion. We calculated rates of repeat abortion per 1000 woman-years in the first year following index abortion and in the entire follow-up period, using the tabulated values of 95% confidence limit factors for a poisson-distributed variable [18] to calculate confidence intervals.

To determine whether rates of repeat abortion were significantly different between cohorts, we plotted time to repeat abortion (or censoring) on a Kaplan–Meier curve and used a stratified log-rank test. The literature shows that women undergoing repeat abortion have higher age [2–4,7] and parity [7,19–21] than women undergoing abortion for the first time. Additionally, they are more likely to have been married [3,6,7,19–21] and to be black or Hispanic [2,3,6,7,20]. Therefore, we used a Cox proportional hazards model to calculate the adjusted hazards ratios while controlling for these variables. Family size served as a proxy for parity. All statistical analyses were conducted using SAS version 9.1.3.

All analyses were intent-to-treat; clients remained in the cohort of original designation for the duration of the study regardless of what contraceptive method was used after the cohorts were defined. In the postabortal IUD cohort, an IUD

may have been removed and, in the control cohort, an IUD may have been initiated.

Institutional review boards at the University of California at San Francisco and University of Pittsburgh approved the study.

3. Results

The IUD cohort consisted of 673 women who initiated intrauterine contraception (either copper-T380a or levonor-gestrel-releasing intrauterine contraceptive) immediately following an abortion during the study. We selected 1346 matched controls (women who initiated other forms of contraception following an abortion) for a total study population of 2019. Cohorts differed on demographic factors as described in Table 1.

Forty-one women in the IUD cohort (6.1%) and 206 women in the control cohort (15.3%) had a repeat abortion at an agency clinic during study follow-up. Of the 41 women in the IUD cohort who had repeat abortions, 12 followed

Table 1
Demographic characteristics of study population

Variable	IUD cohort (n=673)	Controls (n=1346)	p
Age (years), mean (SD)	27.8 (6.2)	25.0 (6.4)	<.001
Marital status, n (%)			.002
Single	442 (66)	993 (74)	
Partnered	104 (15)	166 (12)	
Married	79 (12)	124 (9)	
Divorced	26 (4)	23 (2)	
Undeclared	22 (3)	40 (3)	
Family size,[a] mean (SD)	2.3 (1.4)	1.7 (1.1)	<.001
Race/ethnicity, n (%)			.009
Latina/Hispanic	216 (32)	378 (28)	
White	199 (30)	370 (27)	
Black	128 (19)	264 (20)	
Asian/Pacific Islander	51 (8)	169 (13)	
Other	79 (12)	165 (13)	
Payment source, n (%)			<.001
Medicaid-equivalent	583 (87)	1,006 (75)	
Self-pay	80 (12)	314 (23)	
Other insurance	9 (1)	26 (2)	
Gestational age, n (%)			0.01
4–7 weeks	256 (38)	485 (36)	
7–12 weeks	360 (53)	699 (52)	
12–14 weeks	46 (7)	102 (8)	
14+ weeks	11 (2)	60 (4)	
Contraception chosen,[b] n (%)			
IUD[c]	673 (100)	0 (0)	
Hormonal contraception			
Oral contraceptive	0 (0)	520 (38.6)	
Transcutaneous patch	0 (0)	294 (21.8)	
DMPA	0 (0)	182 (13.5)	
Vaginal ring	0 (0)	65 (4.8)	
Barrier methods[d]	0 (0)	285 (21.2)	

[a] Defined as number of people supported by household income.
[b] Primary contraceptive method chosen on the day of abortion.
[c] Postabortal IUDs only (delayed and interval IUDs were not included).
[d] Including male and female condoms and/or spermicide.

voluntary removals (one for reported side effects, one for a partner feeling the strings and most for reasons not reported). An additional five women became pregnant following complete or partial expulsions, and one woman had her IUD removed due to infection. Reasons for IUD disconti-nuation among the remaining 23 women are unknown. Of women in the IUD cohort who had repeat abortions, six received more than one postabortal IUD during the study period due to expulsion (n=2), voluntary removal (n=2), or for unknown reasons (n=2). There were no reported pregnancies with an IUD in place.

The overall repeat abortion rates were 34.6 [95% confidence interval (CI), 24.8–47.0] and 91.3 (95% CI, 79.4–104.9) repeat abortions per 1000 woman-years among women in the IUD and control cohorts, respectively (p<.001 by log-rank, see Fig. 1). There was no statistically significant difference in the time to repeat abortion between groups (11.4±6.1 months).

Women who received an immediate postabortal IUD had a hazard ratio of 0.38 for repeat abortions compared to controls (95% CI, 0.27–0.53; p<.001). When adjusted in a Cox proportional hazards model for age, marital status, race and family size, women in the IUD cohort had a hazard ratio of 0.37 for repeat abortion (95% CI, 0.26–0.52) compared to women in the control group (Table 2).

The rate of repeat abortion decreased with time from the index abortion. However, the hazards remained proportion-ate. For example, in the first year after the index abortion, repeat abortion rates were 37.6 (95% CI, 24.0–55.0) and 98.0 (95% CI, 82.0–117.1) repeat abortions per 1000 woman-years, for the IUD and control cohorts, respectively (p<.001 by log-rank). The hazard ratio during this period was also 0.37 (95% CI, 0.24–0.57).

In the adjusted Cox model, large family size and being black were associated with an increased risk over time of repeat abortion, while increasing age and being married were associated with a decreased risk (Table 2).

Primary method of contraception chosen by the control cohort during the abortion visit is reviewed in Table 1. Approximately 73% of the control cohort chose to receive emergency contraceptive pills in addition to their primary method of contraception. In this clinical setting, emergency contraception is routinely offered to postabortion patients and covered by most insurers. Of the 1061 women in the control cohort who chose hormonal contraception as their primary birth control method, approximately half (n=547) also chose to receive condoms as a secondary or tertiary method of contraception.

4. Discussion

Women who received immediate postabortal IUD inser-tion in this population had fewer repeat abortions than those who chose other contraceptive methods following an aspiration abortion during the same time period. The
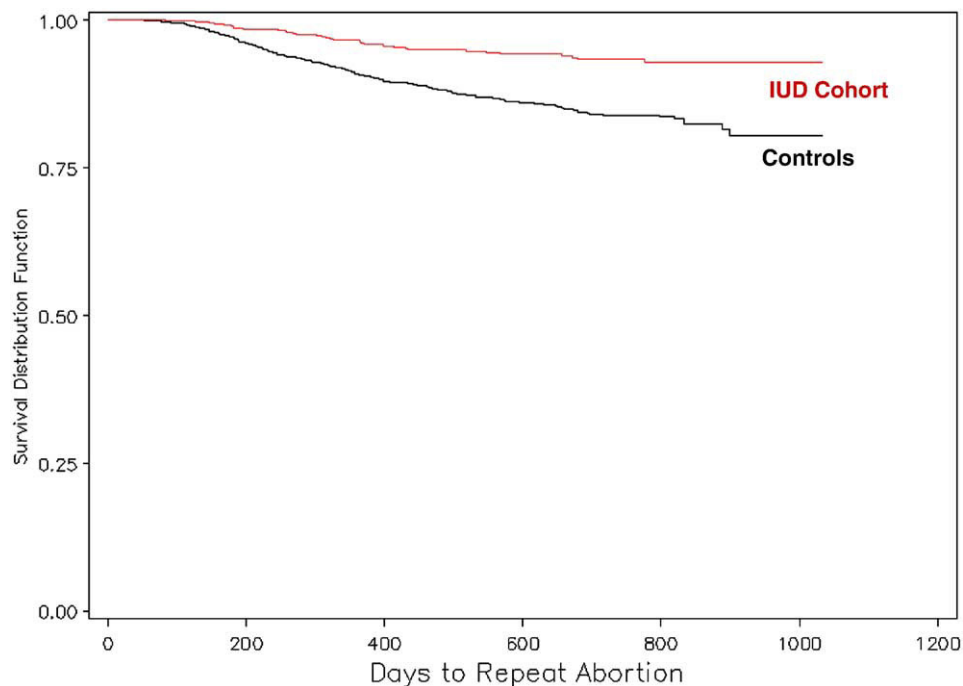
Fig. 1. Kaplan–Meier analysis of time to repeat abortion. Stratified log-rank test: p<.001.

association was strong despite some removals and expulsions during the study, suggesting that immediate IUD insertion may have a powerful effect on prevention of repeat unintended pregnancy.

We also found in our Cox model that younger women have a higher risk for repeat abortion. This difference from previous reports [2,7] reflects a difference in study design. Previous reports compared repeat to first-time aborters (women obtaining repeat abortions were older than those obtaining first-time abortions, likely due to more previous years of fertility in which they could have had a prior

Table 2
Hazard ratios of repeat abortion

Variable	Hazard ratio [a]	95% confidence limits	p
Cohort: IUD vs. controls	0.37	0.26–0.52	<.001
Age: per year	0.97	0.94–0.99	.004
Marital status: compared to single			
Partnered	1.19	0.84–1.71	.33
Married	0.53	0.30–0.94	.03
Divorced	1.85	0.90–3.83	.10
Undeclared	0.61	0.23–1.64	.33
Family size: per additional family member	1.23	1.09–1.38	.001
Race: compared to white			
Black	1.42	0.98–2.05	.06
Latina/Hispanic	1.00	0.69–1.44	.99
Asian/Pacific Islander	1.11	0.70–1.78	.66
Other	1.45	0.95–2.20	.09

[a] Each hazard ratio reflects the change in the risk over time of repeat abortion per unit of analysis specified.

abortion). Our study compared women receiving different forms of contraception on the day of abortion and followed them forward, during which time younger women were more likely to continue to be fertile and seek additional abortion services.

Previous data suggest that adolescent women obtaining repeat abortions are slightly more likely than first-time abortion patients to have become pregnant while using a hormonal method, implying that they may be more frequently provided access to hormonal methods, but have problems obtaining or using them consistently [7]. Intrauterine contraception has consistently been proven safe and effective in young, single and nulliparous women [22–25]. Since younger women have higher fertility and more years of future fertility than older women, it is especially important that highly effective, long-term contraception be available to them following an abortion should they desire it. Access to the IUD does not mean that a young woman needs to use it for a full 5–10 years but that she is given an option to use this "forgettable" form of contraception that does not require actions to remain protected from pregnancy.

A variety of contraceptive methods were used following the index abortion in the control cohort; this group represents a heterogeneous population, and results do not adequately compare intrauterine to other forms of contraception. While contraceptive counseling and method review were made available to women in both the IUD and control cohorts, the contents were not scripted so differences may have introduced confounding. Furthermore, the consequences of delaying IUD insertion following an abortion were impossible to

discern from our data, as only actual insertions were documented. Intent to insert an IUD was not recorded, and the data therefore are unable to capture dropout of clients desiring an IUD who failed to return for insertion, which has proven to be considerable in previous reports [11]. Our results do show a benefit of immediate postabortal IUD insertion compared to other types of postabortion contraception in a real-world population, but further study, preferably a randomized trial, is needed to compare repeat abortion rates in women with immediate vs. delayed postabortal IUD insertion.

It is unclear whether women who opt for the IUD at the time of abortion may be more determined to avoid pregnancy than women who opt for other methods. Even without an IUD option, a subset of "determined" women might be good users of other methods and avoid pregnancy more effectively than a typical contraceptive user. The short-term contraceptive methods appear to be rapidly discontinued after a brief period for the typical woman who chooses those methods. It is important to consider that perhaps it is not just the IUD but the fact that the women who are counseled or select an IUD have a longer-term vision with a keener sense of prevention in mind.

Additional study limitations included the fact that only agency data were available. Repeat abortions obtained at other locations were not captured in our analysis; however, it seems unlikely that women in one cohort would be more or less likely to go to another provider. The use of a retrospective billing and tracking database meant that demographic information was limited without available information on women's gravidity and parity (family size was our only obtainable proxy). Available data on family size referred to the number of people supported by household income, which has the limitation that it may vary somewhat by household structure and socioeconomic status. We know from previous studies [2,3,6,7,19,26] that women obtaining repeat abortions are older and have more children than those obtaining first abortions; our IUD cohort was both older and with larger family size than controls, and it may therefore be more likely that the index abortion among women who obtained an IUD immediately postabortion was already a repeat procedure. It is unclear whether this would impact the likelihood of another repeat procedure. All demographic data were obtained at baseline, and we were unable to capture changes in variables such as parity, marital status, contraceptive use or insurance carrier that may have occurred over the course of the study and affected the likelihood of repeat abortion.

Patterns of contraceptive use within our population are not necessarily generalizable to women throughout the United States. A majority of women in our population were Medicaid-equivalent, and in California, the cost of both their abortions and their subsequent IUD (both the device and the insertion) were state-funded. Many states do not have health coverage that includes contraception or abortion. Furthermore, federal law mandates the separation of Title X family planning funds from any abortion-related service, including counseling or referrals even when requested [27]. Many low-income women have difficulty paying for an abortion, often delaying the procedure in order to accumulate funds and may not have the money to pay for an IUD. Additionally, providers may need to know that they can be reimbursed for concurrent counseling, labs, abortion procedure and IUD insertion. While it is clear that access to an immediate postabortal IUD may continue to be a challenge for some women, provider efforts to utilize available coverage will assist patients in obtaining IUDs.

Screening and office protocols have also presented barriers to immediate postabortal IUD access. Conventional practice has suggested that sexually transmitted infection (STI) screening results must be confirmed to be negative prior to IUD insertion. But such requirements necessitate extra visits and a waiting period, during which IUD candidates may miss the opportunity for immediate postabortal insertion. In light of the updated WHO medical eligibility criteria and new evidence-based labeling, it is becoming more acceptable to allow IUD insertion on the same day as STI screening among low-risk women with no clinical evidence of infection [2,22,28,29].

Recent international studies have found that more intensive contraceptive counseling and services provision alone did not improve contraceptive use or adherence at 4–6 months after an abortion [30,31]. The typical use failure rates of oral contraceptives and barrier methods needs to be emphasized during counseling [32]. Providers should emphasize and encourage use of the integration of longer-acting methods that are less subject to user error and do not require repeat prescriptions.

Our results suggest that immediate postabortal IUD insertion may reduce repeat abortion compared to other contraceptive methods, and further clinical trials are needed to evaluate the impact of immediate vs. delayed IUD insertion. Additional efforts are warranted to increase access to immediate postabortal intrauterine contraception as a safe, effective, and practical means to decrease unintended pregnancy and repeat abortion.

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