Immediate postplacental intrauterine device placement: retrospective cohort study of expulsion and associated risk factors

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BACKGROUND: Postpartum contraception is typically provided during postpartum visits. When desired and accessible, the immediate postpartum period provides an additional opportunity to increase the use of more effective contraceptive methods to potentially reduce subsequent unintended pregnancies and improve pregnancy outcomes. In New York State, recent policy changes expanded Medicaid coverage to include immediate postplacental intrauterine device insertion.

OBJECTIVE: This study aimed to investigate clinically documented intrauterine device expulsion within 12 months of placement in patients who depend on state-funded health insurance.

STUDY DESIGN: This retrospective cohort study included Medicaid patients with an immediate postplacental intrauterine device placed after third-trimester delivery, who delivered between March 2, 2017 and September 2, 2019. Current Procedural Terminology code billing data were used to identify 238 patients who underwent intrauterine device placement during their delivery admission. Electronic medical record data were analyzed using chi-squared tests, *t* tests, and multivariable logistic regression.

RESULTS: There were 17.6% (42/238) documented intrauterine device expulsions within the first year after placement. Among patients with vaginal deliveries, 22.1% (29/131) of intrauterine devices placed had a documented expulsion, whereas the expulsion rate was 12.2% (13/107) among patients who had cesarean deliveries (P=.04). After controlling for body mass index, parity, intrauterine device type, and gestational age, patients who delivered vaginally were more likely to experience intrauterine device expulsion within 1 year compared with those who had cesarean delivery (adjusted odds ratio, 2.71; 95% confidence interval, 1.27−5.80). Patients with a documented intrauterine device expulsion within 1 year were more likely to have a subsequent pregnancy before October 2020 (35.7% [15/42] vs 15.3% [30/196] in the no-expulsion group; P=.002).

CONCLUSION: The overall percentage of documented intrauterine device expulsion within 1 year following immediate postplacental placement was 17.6%, with a greater percentage of expulsion in patients who underwent vaginal delivery. Patients with a documented intrauterine device expulsion within 1 year of placement were significantly more likely to experience a subsequent pregnancy.

Key words: contraception, intrauterine device expulsion, intrauterine devices, long-acting reversible contraception, postpartum period

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We requested and received a waiver of consent because this study meets the following 4 criteria of 45 CFR (Code of Federal Regulations) 46.116(d): (1) This study does not involve more than minimal risk to the participants because it will consist of a retrospective medical record review, and only specific data will be collected from the existing electronic records. (2) Waiving consent will not adversely affect the rights and welfare of the participants because there is no study intervention, and only medical record review will be conducted. (3) The research cannot be practically carried out without this waiver. This is a retrospective data analysis, and the number of medical records would be too large to obtain consent. In addition, contacting patients to obtain consent could lead to confusion and emotional burden placed onto patients, as they might mistakenly believe that their clinical care would be affected by the study. (4) Given the retrospective nature of the study, participants will not be provided with additional information.

Availability of data statement: A deidentified data set is available (Levandowski, Brooke. 2024. "Postpartum IUD Study." OSF. June 28. osf.io/vuqnb).

Ethics statement: The University of Rochester Research Subjects Review Board determined that this study was exempt from full review (STUDY00004484).

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Why was this study conducted?

We investigated clinically documented intrauterine device (IUD) expulsion within 12 months of placement in patients who depend on state-funded health insurance.

Key findings

Patients who had vaginal delivery were significantly more likely to both have a documented immediate postplacental IUD expulsion within 1 year of placement and experience a subsequent pregnancy.

What does this add to what is known?

This large pragmatic cohort study on Medicaid patients found a high proportion of clinically documented IUD expulsion within 12 months of IUD placement, particularly amongst those with vaginal deliveries. This emphasizes the importance of improving patient consent detailing expulsion risks and follow-up to determine correct placement follow-up to achieve the full benefits of immediate postplacental IUD insertion.

Introduction

Short intervals between pregnancies are associated with increased risk of adverse pregnancy outcomes, and an estimated 70% of pregnancies within 1 year of delivery are unintended.[1–3] When desired and accessible, increasing the use of more effective contraceptive methods may reduce unintended pregnancy and improve pregnancy outcomes. Contraception is often addressed at the postpartum visit several weeks after delivery; however, an estimated 33% to 41% of patients already resume sexual intercourse by 5 to 6 weeks postpartum.[4] In addition, structural barriers to attendance at postpartum visits have been reported for patients with limited income, young patients, and those who belong to Black, Indigenous, or communities of color, placing them at increased risk of unintended pregnancy.[5,6]

Supporting shared decision-making about postpartum contraception depends on many factors, including a patient's medical history, anatomy, and personal preferences. Immediate postplacental long-acting reversible contraception (LARC) has relatively few contraindications, efficacy >99% when appropriately positioned, and higher continuation rates at 12 to 24 months compared with non-LARC methods.[7–9] LARC methods include the copper intrauterine device (IUD), the levonorgestrel IUD, and the etonogestrel implant. The American College of Obstetricians and Gynecologists (ACOG) recommends that obstetrical providers incorporate immediate postplacental LARC into their practice, and that all patients be counseled on LARC in a context that allows for informed decision-making.[10]

Immediate postplacental IUD insertion offers many benefits compared with interval IUD insertion, such as avoiding discomfort related to insertion, ultimately not receiving the desired device, and unintended pregnancy before insertion of the device. However, immediate postplacental IUD insertion is associated with higher rates of expulsion and malposition. Although these clinical outcomes vary greatly across studies, study populations, mode of delivery, and type of IUD placed, the implications can be meaningful at the individual level, as in the case of a required invasive procedure to remove a mispositioned IUD or an unintended or short-interval pregnancy after expulsion.[8,11–16] We sought to investigate clinically documented IUD expulsion within 12 months of IUD placement in patients who depend on state-funded health insurance.

Materials and methods

This retrospective cohort study included patients with an immediate postplacental IUD placed after third-trimester delivery. We used the University of Rochester Clinical & Translational Science Institute's Informatics Service Request to obtain electronic medical records of patients who delivered between March 2, 2017 and September 2, 2019 at 2 hospitals within the University of Rochester medical system. This time period was chosen to correspond with the implementation of a New York State Department of Health policy requiring Medicaid and Medicaid Managed Care plans to pay hospitals for immediate postplacental LARC insertion separately from the inpatient stay for delivery.[17]

We used CPT (Current Procedural Terminology) code billing data to identify patients who underwent IUD placement during their delivery admission, using CPT codes J7300 (IUD ParaGard; CooperSurgical, Trumbull, CT), J7301 (IUD Skyla; Bayer, Whippany, NJ), J7297 (IUD Liletta; Odyssea Pharma SPRL, Grâce-Hollogne, Belgium), and J7298 (IUD Mirena; Bayer). Coauthors (E.L. and S.M.) abstracted data from patient medical records; a random sample of 10% of the medical records was reviewed by both authors to ensure data quality. Discrepancies were resolved through discussion and reference to the medical records. We included patients who underwent a third-trimester delivery and had an IUD successfully placed during their delivery admission at either Strong Memorial Hospital, a large academic center, or Highland Hospital, an affiliated community hospital. We excluded patients if their delivery occurred at <28 weeks of gestation or an IUD was not placed, either because of an unsuccessful attempt or because of a billing error. Our primary dependent variable was a clinically documented IUD expulsion within 12 months of placement. This was identified by reviewing the medical record 12 months after placement for any patient-reported expulsion in any type of patient encounter or any imaging that confirmed the absence of an IUD. Secondary variables included patient demographics, delivery and IUD variables, and postpartum data, including subsequent pregnancy before October 2020.

Eighteen patients had unknown gestational age and 2 patients had no prenatal care and therefore no gestational age estimate; all were labeled as missing gestational age. Marital status was categorized as single, married or with a life partner, divorced or legally separated, and unknown. Race, as identified by the patients, was obtained from the electronic medical record. Race was categorized as White, Black, and other, which included Asian, American Indian, Alaska Native, Hawaiian or other Pacific Islander, and other. Two patients identified as >1 race (White and Black, and White and other, respectively); the non-White option was chosen for both patients. Race data were collected for the study participants due to the known disparities in postpartum outcomes among different racialized groups. During the studied time period, the only gender identities used within the medical record were male and female. All 238 patients were identified in the medical records as female.

When analyzing the risk factors for IUD expulsion, we chose a body mass index (BMI) (kg/m^2) <30 as the reference range for comparison with class I, II, and III obesity to allow for greater generalizability given that the average female BMI in the United States is 26.6 and only 17 patients had a normal BMI of 20 to 25 in this study. Parity was recorded at the time of admission. Therefore, we used nulliparous women as the reference category and compared them with multiparous (1−4 previous deliveries) and grand multiparous (>4 previous deliveries) women. To determine short-interval pregnancy rates, subsequent pregnancy within 18 months of the initial delivery was defined by an interpregnancy interval of <540 days.

We conducted univariate and bivariate analyses using chi-squared tests for categorical variables and *t* tests for continuous variables. Multivariable logistic regression was conducted using backward elimination. Specifically, we entered independent variables into the regression on the basis of a priori knowledge of their relationship with IUD expulsion (BMI, previous IUD use, type of IUD) or a statistically significant relationship with the outcome in bivariate analyses (gestational age at delivery, parity, mode of delivery). We used the likelihood-ratio test to compare model goodness-of-fit, focusing on the ratio of likelihood; the most parsimonious model was selected. Analyses were conducted using Stata, version 18 (StataCorp, College Station, TX). The University of Rochester Research Subjects Review Board determined that this study was exempt from full review (STUDY00004484).

Results

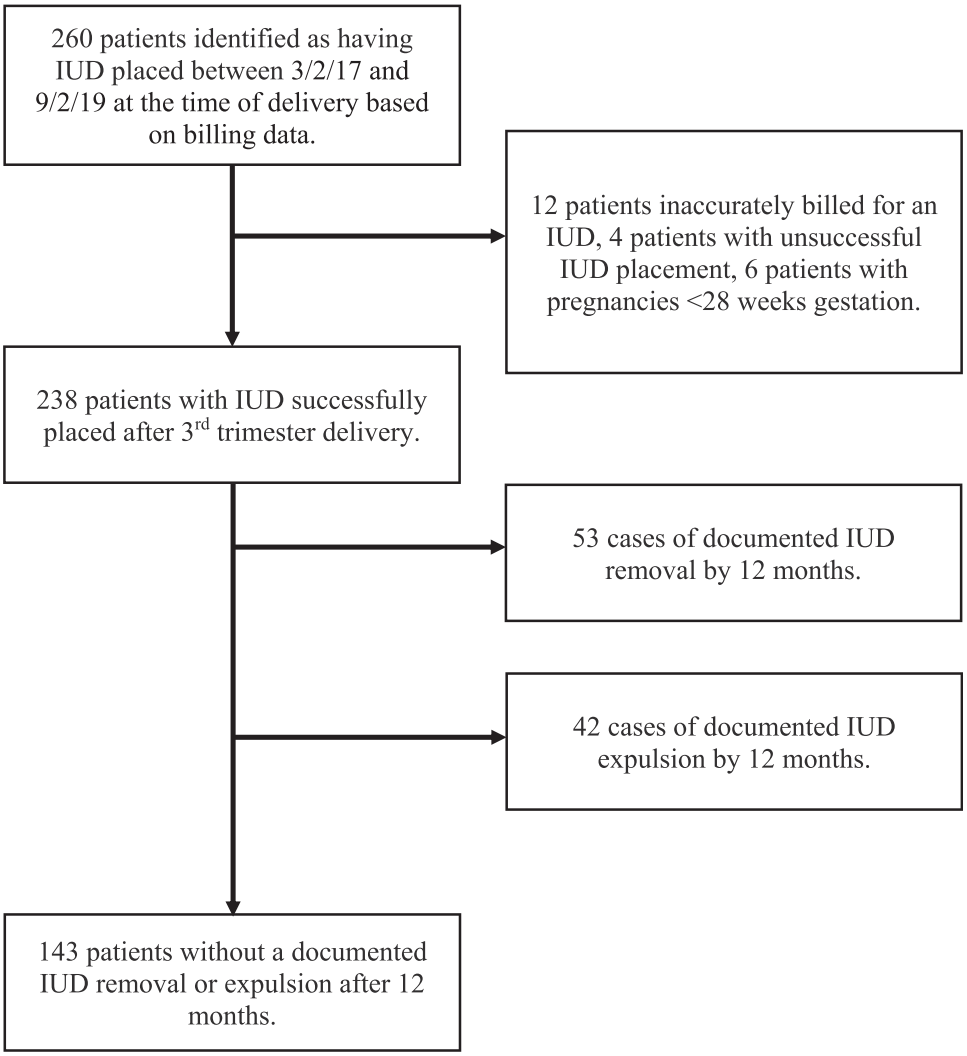
After review of the billing code data, 260 patients were identified as having an IUD placed after childbearing. Twenty-two patients were excluded because their gestational age at the time of delivery was <28 weeks, the IUD was not successfully placed, or the patient was billed in error and no IUD was placed or attempted to be placed (Figure). A total of 238 patients had an IUD successfully placed during their delivery admission. Two of the 238 IUDs were placed >10 minutes after delivery of the placenta (one at 4 hours after delivery and the other on postpartum day 2), but before hospital discharge. There was no universal method of placement encountered throughout the medical records reviewed, with various methods described in both vaginal and cesarean delivery. Further, some medical records did not describe the method of placement specifically. Some clinicians used ultrasound guidance for IUD placement after vaginal delivery, whereas others either did not use ultrasound or did not document its use. Of the patients with an immediate postplacental IUD placed, 223 had a 4- to 6-week postpartum visit scheduled, and 167 (74.9%) patients attended their visit.

A total of 42 patients were identified as having a clinically documented IUD expulsion within 12 months of placement (17.6%). Of the 2 patients who had an IUD placed during their admission, but >10 minutes after placental delivery, one had a documented IUD expulsion 82 days after delivery and the other had no documented expulsion. There were no statistically significant differences in the baseline demographics between the 2 groups (Table 1). The clinical characteristics of the patients are shown in Table 2. A greater percentage of patients who underwent a vaginal delivery had an identified IUD expulsion compared with those who underwent cesarean delivery (22.1% vs 12.2%; *P*=.04). The rate of IUD expulsion did not significantly differ by IUD type, although only a small quantity of copper IUDs were placed compared with levonorgestrel IUDs (31 vs 207, respectively; *P*=.21). Patients who experienced an IUD expulsion were significantly more likely to have a subsequent pregnancy from the time of IUD placement until the time of medical record review in October 2020 (35.7 vs 15.3%; *P*=.002). Among patients with a subsequent pregnancy, the 18-month pregnancy rate was 65.1% overall, with no significant difference between those who experienced an IUD expulsion and those who did not (71.4 vs 62.1%; *P*=.55).

Although 19 patients had an unknown interval from delivery to IUD expulsion, the average interval to expulsion for cases in which the expulsion date was documented was 43.3 days, with a range of 0 to 230 days (median, 15; interquartile range, 60). The interval to expulsion was only calculated if the exact date of the expulsion was known and not if the patient reported it during an encounter without a specific date, such as at their postpartum visit. For cases of known interval to expulsion, 16 (69.6%) occurred within 60 days after placement.

A total of 53 patients (22.3%) had a documented IUD removal within 12 months of placement. Of these removals, 23 (43.4%) were due to undesired side effects; 19 (35.9%) were removed because of imaging-confirmed malposition of the device, as noted on the ultrasound, including abnormally rotated, upside-down, and low-lying position. One (1.9%) was removed for fertility, whereas 0 were removed because of desire for another birth control method. When taking into account the percentage of IUD expulsions and IUD removals within 12 months of placement, the total documented discontinuation rate

FIGURE
Identified patients with an immediate postplacental IUD placed at 2 affiliated hospitals in Rochester, NY from 2017 to 2019[a]



[a]Between March 2, 2017 and September 2, 2019.

IUD, intrauterine device.

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was 39.9%. Given that 30 of 95 patients with an expelled or removed immediate postplacental IUD opted for IUD replacement, the overall documented rate of discontinuation of IUD use was 19.8%. In other words, medical records indicated that 80.2% of patients continued using an IUD. There were no documented cases of IUD expulsion after IUD reinsertion.

Patients who underwent vaginal delivery had twice the odds of having a documented IUD expulsion compared with patients who had a cesarean delivery (odds ratio, 2.06; 95% confidence interval [CI], 1.01−4.19). There was no difference in the odds of documented expulsion when examining other characteristics individually, including BMI (30−35, 35−40, ≥40), type of IUD (levonorgestrel, copper), parity (1−4, ≥5), and previous IUD use (yes, no). After controlling for BMI, parity, IUD type, and gestational age at the time of delivery, patients who delivered vaginally had 2.71 times greater odds (95% CI, 1.27−5.80) of a documented IUD expulsion compared with patients who delivered via cesarean delivery.

Discussion

Principal findings

This retrospective analysis identified 42 clinically documented IUD expulsions within 12 months after IUD placement during the delivery admission of 238 patients. In cases for which the exact interval from IUD placement to expulsion was known, most expulsions were within 60 days of placement, likely reflecting IUD expulsion during the

TABLE 1
Baseline characteristics of women with postplacental intrauterine device placement at 2 hospitals in Rochester, New York from 2017 to 2019[a] (n=238)

Variable	IUD expulsion n=42 (%)	No IUD expulsion n=196 (%)	Total	*P* value[b]
Age (y)	27.6	26.9	238	.47
Gestational age at delivery (wk)	37.1	38.2	238	.07
Parity[c]				.34
0	8 (19.0)	43 (21.9)	51	
1–4	30 (71.4)	141 (71.9)	171	
≥5	4 (9.5)	12 (1.0)	16	
BMI[d]				.50
BMI <30	10 (24.4)	64 (34.2)	74	
Class I (BMI 30–35)	12 (29.3)	50 (26.7)	62	
Class II (BMI 35–40)	8 (19.5)	39 (20.9)	47	
Class III (BMI ≥40)	11 (26.8)	34 (18.2)	45	
Marital status				.99
Single	35 (83.3)	160 (81.6)	195	
Married or life partner	5 (11.9)	26 (13.3)	31	
Divorced or legally separated	1 (2.4)	6 (3.1)	7	
Unknown	1 (2.4)	4 (2.0)	5	
Race				.85
Black	17 (40.5)	86 (43.9)	103	
Other	9 (21.4)	35 (17.9)	44	
White	16 (38.1)	75 (38.3)	91	

BMI, body mass index; *IUD*, intrauterine device.

[a] Between March 2, 2017 and September 2, 2019; [b] Chi-square tests were used for categorical variables and *t* tests for continuous variables; [c] Before index delivery; [d] Missing data on 10 participants.

Leubner. Intrauterine device expulsion after immediate postplacental placement. Am J Obstet Gynecol Glob Rep 2024.

postpartum process of uterine involution. The odds of the IUD being expelled within the first 12 months after placement were higher in patients who underwent vaginal delivery, which has been demonstrated in previous literature, including a large systematic review of 48 studies.[18,19] This finding could be explained by the direct nature of IUD placement during cesarean delivery through the hysterotomy, as opposed to the indirect method of placement during a vaginal delivery in which the clinician guides the IUD to the uterine fundus. Regardless of mode of delivery, there was significant variation in methodology of IUD placement in the medical records reviewed, and often limited documentation on the method of placement.

Results in the context of what is known

The odds of clinically documented IUD expulsion did not differ by BMI, parity, type of IUD, or previous IUD use. Our finding of vaginal delivery as a risk factor for expulsion is confirmed in other studies.[19] Generally, previous studies have demonstrated higher expulsion rates for levonorgestrel IUDs compared with copper IUDs, possibly due to the inflammatory nature of copper IUDs.[12,18] The amount of copper IUDs placed at our institution was relatively small (n=31), and although there was a trend toward fewer expulsions of levonorgestrel IUDs, this did not reach statistical significance.

There were more subsequent pregnancies in the IUD expulsion group, consistent with previous studies,[3] although data were not collected about the intendedness of these pregnancies. Planned follow-up soon after delivery is important given that the average interval to recognized expulsion was 43.3 days after delivery. If IUD expulsions were identified and addressed as soon as they occurred, some of the subsequent, possibly unintended, pregnancies might have been prevented.

Clinical implications

This pragmatic cohort study in a clinical setting highlights the need for continued improvement in medical record documentation. There is a need to develop, train, and implement a protocol for documenting IUD insertion that ensures that appropriate billing codes are used, so that patients are only billed

TABLE 2
Clinical characteristics of women with postplacental intrauterine device placement at 2 hospitals in Rochester, New York from 2017 to 2019[a] (n=238)

Characteristics	IUD expulsion n=42 (%)	No IUD expulsion n=196 (%)	Total n=238	*P* value[b]
Previous IUD use				.61
Yes	13 (31.0)	53 (27.0)	66	
No	29 (69.0)	143 (73.0)	172	
Prenatal visit counseling about birth control[c]				.81
Yes	35 (85.4)	158 (86.8)	193	
No	6 (14.6)	24 (13.2)	30	
Mode of delivery				.04
Vaginal	29 (69.0)	102 (52.0)	131	
Cesarean	13 (31.0)	94 (48.0)	107	
Type of IUD				.21
Levonorgestrel	39 (92.9)	168 (85.7)	207	
Copper	3 (7.1)	28 (14.3)	31	
Subsequent pregnancy documented				.002
Yes	15 (35.7)	30 (15.3)	45	
No	27 (64.3)	166 (14.7)	193	

IUD, intrauterine device.

[a] Between March 2, 2017 and September 2, 2019; [b] Chi-square tests were used for categorical variables and *t* tests for continuous variables; [c] Missing data on 15 participants.

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when IUDs are placed. Enhanced follow-up—through phone screening or automatic ultrasound scheduling for those with vaginal delivery—might reduce unintended pregnancies due to IUD misplacement or expulsion. Although additional clinical time is required to improve documentation and enhance follow-up, it is important to note that this requirement is not extended to all patients receiving immediate postplacental IUD placement given that approximately 80% of patients were still using their IUD at the end of the first year.

Ultimately, shared decision-making should involve the patient so that they can decide if an immediate postplacental IUD aligns with their reproductive goals. This should include a discussion about ability to access care if a malpositioned IUD is identified or if they desire removal when strings are not visible. If not already in place, we recommend structured and standardized postplacental IUD consent tools to minimize the risk of bias in counseling and ensure that clinicians are prompted to discuss the unique risks of postplacental IUD insertion.

Research implications

This cohort study includes a larger sample size than many previous studies[7,8,13] investigating IUD expulsion after immediate postplacental IUD placement, the largest of which had 201 participants.[8] The findings indicate a higher rate of IUD expulsion compared with interval placement, with vaginal delivery being a risk factor for expulsion. Future research should be guided toward investigating the best placement techniques and methodology to decrease IUD expulsion following delivery in general, and specifically after vaginal delivery. Other future directions include consideration of possible regret related to IUD placement, particularly considering the removal of 53 IUDs. In addition, understanding how risk factors for IUD expulsion influence IUD removal, particularly removals due to malposition (which accounted for 35.9% of removals), requires further investigation. Given the expulsion rate and high number of removals for malposition, this study could inform implementation of a postplacental IUD follow-up protocol (eg, ultrasound or phone call at 3 weeks).

Strengths and limitations

In addition to the varying placement methods and documentation described above, the limitations of this study include its retrospective nature. The clinically documented IUD expulsions were identified through medical record review, either reported by the patient or detected through imaging. It is likely that the actual prevalence of IUD expulsion is underrepresented given that additional cases might not have been identified or reported by patients, documented by clinicians, or recorded if the patient followed up with a clinician outside of the original medical system. Further, additional immediate postplacental IUDs may have been placed within the specified time frame, but incorrectly

documented or not billed properly. Although most patients (74.9%) attended their postpartum visit, several patients were noted to have little medical contact after delivery, and therefore knowledge of their postpartum course is limited. Further, 2 of the patients included had their IUD placed >10 minutes after delivery of the placenta. Although this represents a small percentage of the patients, it exceeds the ACOG-recommended immediate postplacental time period. An additional limitation is the lack of a full range of gender identity options within the medical record other than the dichotomous option of male or female, which may not represent the true gender identity of all patients.

This is one of the largest cohort studies of patients with an immediate postplacental IUD placed after third-trimester delivery. Conducted in a pragmatic clinical setting, this study indicates opportunities for improvement in medical record documentation.

Conclusions

Immediate postplacental IUD insertion offers many benefits compared with interval IUD insertion, such as avoiding discomfort related to insertion, ultimately not receiving the desired device, and unintended pregnancy before insertion of the device. However, given the high proportion of clinically documented IUD expulsion within 12 months of IUD placement, in patients who depend on state-funded health insurance, better patient follow-up is recommended to achieve the full benefits of immediate postplacental IUD insertion, including reducing subsequent unintended pregnancy. ■

CRediT authorship contribution statement

Emily Leubner: Writing – review & editing, Writing – original draft, Validation, Project administration, Data curation, Conceptualization. **Brooke A. Levandowski:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis. **Sage Mikami:** Writing – review & editing, Validation, Data curation. **Theresa Green:** Writing – review & editing, Conceptualization. **Sarah Betstadt:** Writing – review & editing, Supervision, Methodology.

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